How To Rook Yourself

EVERYONE has a plan today. The government seems to have the best plans to take care of infants, children, farmers, workers, bankrupt companies and the sex life of the tsetse fly.

A few people are left out of this picture. There are no plans for the white collar worker; the professional person; the housewife who does her own mending, washing, cooking, cleaning, worrying; people who still have self-reliance and fortitude; and companies which insist on rowing their own boat.

Then there are the widows, the stockholders, the proud but poor who have seen better days and want nothing from anybody, and people who have little or nothing and want no handouts but something more substantial like hope and faith.

We propose in line of the present trend to have something like the following:

All kids who have had their allowance cut by their pops—because taxes are so high—should have a subsidy from the government making their last highest rate, parity.

Farmers should pay no attention to prices their products will bring. They should just be paid by the government what they think the prices should be. This will save money on clerical, storage and political expenses.

All bankrupt companies should immediately be paid their past highest net profit. If they never had any, their handout should be equal to what the best run company in the group makes.

All white collar workers should be paid for the time they spend in having nightmares about how they will pay the higher prices which come with price and wage freezes.

Professional workers should be paid on a 24 hour basis. Any thinking they do has to do with their profession and is good for the country. Any pipe dreams they have should bring a premium rate. The dreams should be recorded and sent to Washington.

People with self-reliance and fortitude should have a bonus equal to three times their regular wages. In time this will cause them to lose their self-reliance and fortitude and so become part of the "norm."

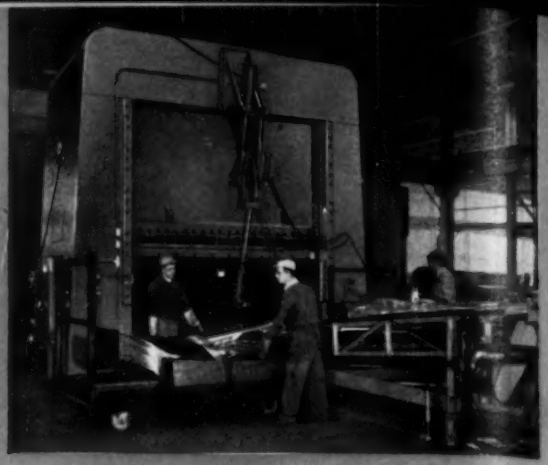
Widows and stockholders should receive from the government the difference between what they get in dividends and what their next door neighbor gets at his regular job. This will put more money into circulation and everyone will have what they want.

After everyone is taken care of this way we will soon get somewhere—to the ash pile.

Tom Campbell

Editor

UNOBSTRUCTED PRODUCTION AREAS like the one around these Danly Underdrive Presses are a feature of underdrive press installations—and typical of the efficient working conditions found in the new Buffalo Stamping Plant of the Ford Motor Company.



FINISHED STAMPINGS are removed from the press automatically here at the end of the line by an automatic unloading device. This mechanical handling, "Automation," is a Ford development for increased material handling efficiency.

Producing Big Stampings Faster with DANLY UNDERDRIVE at FORD'S new Buffalo Stamping Plant

Uninterrupted press operation and speedy, efficient material handling are vital in the production of large automobile body stampings. Big Danly Underdrive Presses like these fill the bill in the huge new plant of the Buffalo Stamping Division, Ford Motor Company.

Danly Underdrive Press design provides maximum head room for crane ways, extra clear working space to facilitate material handling, and keeps nearly all service and maintenance operations on a separate sub-floor level, clear of the production area. In addition, Danly features like the exclusive Danly Cool-Running Clutch and pressure lubrication monitored by a safety switch automatically assure steady, dependable performance under the punishment of continuous high speed production.

Call a Danly Press Engineer today for a specific discussion of the advantages of Danly Presses on *your* production line.

Mechanical Presses . . . 50 to 3000 tons

DANLY®

IT COSTS LESS TO RUN A DANLY PRESS

IRON AGE *newsfront*

news methods and product forecast

► Parts, trim and nameplates requiring colored decorative detail can now be lacquered and plated in a continuous operation. The process uses a new lacquer that retains its gloss and tenacity through washing solutions and hot nickel and chromium plating baths --as well as through shearing, forming and stamping. A wide selection of colors is available.

► The pinch on alloy steels will make a controlled materials plan welcome in a lot of plants. Increasing demands for alloy for the defense program, stockpiling and a shortage of hot top capacity have combined to create what many observers feel is the tightest steel supply situation since the end of the war.

A critical aspect of the alloy situation is this: There can be no substantial help through conversion as there was in the case of flat-rolled steel.

► Forged titanium connecting rods for aircraft reciprocating engines are under test. Cast or forged titanium pistons are under consideration but as yet have not been tested.

► Manufacturers of prefabricated wood housing are urging their products on the military personally as well as through an advertising campaign. Idea is to sell wood as a "natural" substitute for steel. Army and Air Force buying offices are giving serious consideration to large orders but the Navy remains unimpressed. Contracts for nearly 15,000 quonset huts, each requiring about 5 tons of steel, were recently let by the Navy.

► Spain plans to extract oil from shale in a plant at Puertollano near the soft coal mines. It is expected that the bituminous schist will furnish 65 pct of all the lubricating oil now used in Spain.

► Piston rings for several types of internal combustion engines are being successfully made from iron powder by General Motors. Iron powder rings were made in England before and during the last war but costs were out of line.

► Steel conversion has received Washington's blessing--but it has also come under its control. Firms receiving programmed steel are being told to continue to use the same percentage of conversion steel they previously used. In some cases the government is directing that excess ingot output be shipped to a certain mill for rolling for sale to a designated customer.

But hitches are showing up because conversion steel buying has been irregular and it is almost impossible to set up a fair base period.

► A small 2-cylinder Australian car based on a French design will soon be in production. The chassis is reported to be of cast aluminum. All four wheels will be independently sprung.

► Skid-detecting devices now keep all B-47 and B-51 planes on a straight path no matter how hard pilots step on the brakes. The Air Force plans to equip other planes with the device which has long been used by railroads. Two types of devices are being used; both "sense" a skid and release brake pressure until the skidding stops. They may also be put on trucks and busses.

WHY RISK THIS TO SAVE A DIME A WEEK?

The scrap pile of many a plant—whether it makes gears, bricks or gummed tape—thrives on poor temperature control. And the margin is often narrow . . . a variation of only a few degrees meaning thousands of dollars in rejected material or damaged equipment.

Yet many plants risk this loss without realizing it! They attack the temperature control problem correctly, by using potentiometer pyrometers to get top accuracy and dependability. But they sometimes slip on the "standardizing" adjustments which such instruments need to maintain those qualities. Overlooking the need for frequent and regular standardizing, these plants permit the operation to be done by hand . . . and thus possibly skimped or forgotten.

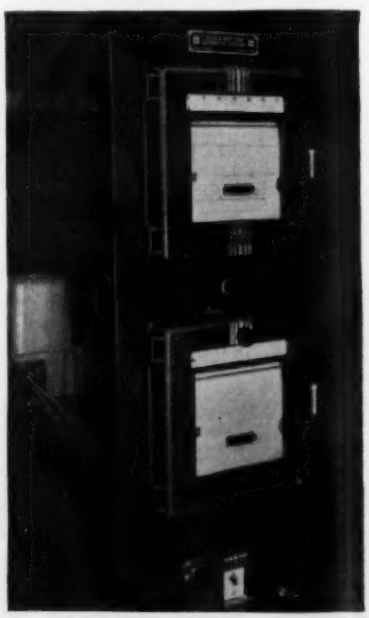
There is just one way of removing this threat to the accuracy of process temperature. It's by putting the standardizing responsibility where it belongs . . . directly on the recorders and controllers themselves.

A relatively simple device, the automatic standardizer, should be built into the potentiometer to handle this job. It checks the measuring circuit at least every 48 minutes . . . adjusts when necessary . . . *never forgets!* And this essential feature, amortized in the usual 10 years, costs less than 10¢ a week.

So, regardless of what make instruments you buy, be sure to specify automatic standardizing. It's cheap . . . safe . . . sure!

Write Leeds & Northrup Company, 4956 Stenton Avenue, Philadelphia 44, Pennsylvania.

AUTOMATIC STANDARDIZING Guards Product Quality When You Use Instruments Like These



Speedomax Potentiometer Instruments and Drive Unit (left) helping maintain production in an Ohio metal-working plant.

Jrl Ad ND4(3)

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

LEEDS & NORTHRUP CO.

these on your screw machine parts ...do the job with MX

the new free-machining Bessemer screw stock!

Would you spend $2.34 extra for MX to save $73.14 on the manufactured cost of 10,000 parts? Do you think a saving of $21.71 justifies spending 70 cents more for MX? Would you pay 37 cents more for MX to save $52.90?

We think you would.

Savings like these are typical of the results obtained when MX is used in place of ordinary Bessemer screw stock. Enthusiastic reports from screw machine operators emphasize the fact that whenever fast-cutting MX is put to work, production goes up and costs go down . . . anywhere from 6% to 22%. In fact, you can safely figure that MX will cut the cost of *any* part you now machine from ordinary Bessemer screw stock. And the more the machine work required, the greater the savings will be. That's why, despite its slightly higher cost, MX is proving itself the most *economical* bar stock developed to date.

U·S·S Free-Machining MX cuts costs in four ways. By increasing the rate of production, *it lowers the cost per part.* By prolonging tool life *it reduces down-time.* By assuring better part finish it often *eliminates extra finishing operations.* By providing closer dimensional accuracy, *rejections are minimized.*

If you haven't yet tried MX on a production basis, do it soon.

U·S·S Free-Machining MX is being produced in all the popular bar sections and sizes. You can obtain it in cold finished form from your regular supplier as "MX" or under his own identifying trade name. In hot rolled form MX is available direct through our nearest district sales office.

● *For more parts and better parts—at lower cost per part*—standardize on MX.

USE THIS COUPON

United States Steel Company
Room 4240 Carnegie Building, Pittsburgh 30, Pa.

Please send me a copy of the MX bulletin

Name.....

Address.....

Company.....

City.....Zone....State.....

USS TRADE MARK

AMERICAN STEEL & WIRE COMPANY, CLEVELAND · COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM · UNITED STATES STEEL COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

1-336

UNITED STATES STEEL

TRAILERS BELONG

IN YOUR HANDLING SYSTEM

Whether hauled with conventional tractors or by power lift trucks, industrial trailers provide the lowest cost method for the horizontal movement of materials. Check your present system for the added economies trailers make possible.

Famous MERCURY A-310 Trailer
Unequalled in design, efficiency and ruggedness. Over a million in use.

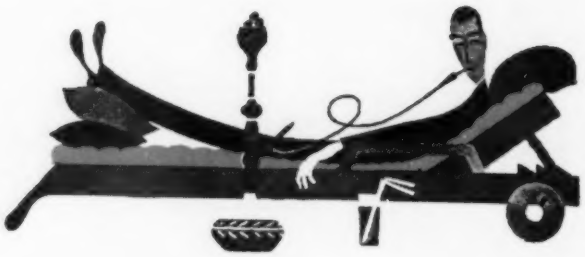
MERCURY "Banty" gas tractor hauls train of loaded trailers.

MERCURY "Jeep" fork truck hauls train of MERCURY A-310 trailers.

For complete details on MERCURY standard and special type trailers, request your free copies of Bulletins 160 and A-999.

MERCURY

MANUFACTURING COMPANY
4144 S. Halsted Street, Chicago 9, Illinois
TRACTORS·TRAILERS·LIFT TRUCKS



Fatigue Cracks

by Charles T. Post

What Price Labor

One of the most significant pieces of information to drift out of the current United Nations Economic and Social Council meeting in Chile came from the Polish delegate who claimed that a Russian worker can get a bottle of vodka by working only 340 minutes, while a British worker must labor 600 minutes to buy a bottle of whisky.

This, we suppose, was meant as Communist propaganda. If the nation's lushes suddenly turn subversive, you'll know why, and the Russians are welcome to them. But the point is that the Americans, after needling the Commies for years over the comparative hours of labor required to buy bread, clothes, and shelter, have finally gotten them to talk in the same terms.

That is a big step. If the Russians can be egged into talking our language on more important matters, we're half way to an understanding. In the current case, for instance, it should be easy to prove that a well-aged fifth of Scotch is worth every bit of 600 minutes' labor. On our personal incentive scale, even ten minutes is too long to work for a bottle of vodka.

Watch the Birdie

If a photographer shows up at your plant and says he is taking pictures for the IRON AGE, watch your step! First thing you know, you may be reaching for your wallet to pay him.

A variation of the prize baby picture dodge, often pulled on proud mothers, the stunt is to use the name of a reputable publication to gain entree to the plant. Usually, the photographer will offer to have the publication print the pictures if you'll buy a few extra sets of prints at a good stiff fee. The magazine, of course, knows nothing about the whole transaction until the subject complains—if the subject complains.

Puzzlers

We have always said that advertising pays off and M. G. Goff, Girard Mfg. Co., helped prove our point. In the February 8 issue we complained that we had received no answers to ball bearing problem so Mr. Goff, W. J. Dailey and N. L. Case went right to work on it. All got the right answer, too. R. F. Books, Rochester, Minn., successfully climbed the ladder problem and C. G. Heilman, Commonwealth Industries, Inc., and J. Carlin, Chilton Co., got dizzy following the second hand on their watches.

New candidates for the cryptographic society are R. W. Huff, Canton, O.; O. E. Adler, National Standard Co.; Martin Baron, Sears, Roebuck & Co.; R. L. Stephens, Stephens Mfg. Co.; J. A. Davenport, Cincinnati; C. Lippincott, Hunter Mfg. Co.; C. S. Dunning, U. S. Steel Co.; J. H. Britton, Colorado Fuel & Iron Corp.; C. E. Eves, Shakeproof, Inc.; Esther Horn, Eastman Kodak Co.; Sidney Lubin, Astorlord Mfg. Co.; J. P. McLeod, Porter McLeod Machine Tool Co., Inc.; W. D. Samuels, Joy Mfg. Co., and H. L. Ludwig, U. S. Steel Export Co.

The lucky contractor in last week's problem received 1556.335 tons of steel under his original contract.

While on a trip to pick up a hot story your f.f.j.'s machinery editor, George Elwers, decided that the annoying clicks he heard every time the wheels of the railroad car passed over the joints between the rails should be put to some useful purpose. Knowing that a standard rail is 39 ft. long he figured he could determine the speed of the train by counting the number of clicks in a given time. He also figured out that if he selected the proper length of time the number of clicks would be numerically equal to the speed. He wants you to determine this length of time without assuming a given speed and thereby proving that this length of time is the same for all speeds.

Cut motor failures with these two

Don't take our word for it. Here's what users of Life-Lines say: "We always have had bearing failures on our pump motors. It was quite an expense in repair costs and down time. Since we installed Life-Line motors, we have had no down time . . . no failures. We now standardize on Life-Lines."

Another user reports: "Our former starters employed solder pot mechanisms. Much trouble was experienced. Since we've switched to Life-Linestarters,® our troubles are gone. The operation of the bimetallic disc is positive."

These reports are two of several hundred such reports resulting from the new kind of dependability built into the Life-Line motor and Life-Linestarter.

Life-Line Motors

Steel frame . . . adds strength, cuts weight.
Pre-lubricated bearings . . . no greasing.
Improved windings . . . lengthen electrical life.

Life-Linestarter

Bimetallic disc . . . calibration unaffected by aging or oxidation.
Servicing is simple . . . all parts front removable.
Screw driver only tool required.

Get the advantages of these two—your best bet to cut motor failures. Ask your Westinghouse representative for copies of "Life-Line Motor Book", B-3842 and "Tomorrow's Starter Today", B-4677, or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa.

J-21644

YOU CAN BE SURE.. IF IT'S Westinghouse

Life-Line MOTORS and CONTROLS

FREE *publications*

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just fill in and mail the postcard on the opposite page.

Materials Handling Box

The Hazen knock-down materials handling box, offering multiple savings through less space, time and labor, is described in a new 6-p. folder listing and illustrating a few of the innumerable uses. The method of assembly is shown and specifications for the two box sizes available are listed. Information is given on avoiding "shadow" tonnage and stacking without load-binders in trailers. *Jervis B. Webb Co.*

For free copy insert No. 1 on postcard.

Large Castings, Machines

A brief insight into the various activities, products and facilities of this old established German company is provided in a new 38-p. illustrated catalog showing examples of both very large and small iron and steel castings, as well as completed assemblies such as gas cylinders, blast furnace slag ladle wagons, large presses and pumping machines. The extensive machining facilities shown permit handling any kind of job up to the largest dimensions. *Eisenwerke Mulheim/Meiderich A. G.*

For free copy insert No. 2 on postcard.

Cranes With Dynaflow

A new 4-p. brochure describes the application of a torque converter combined with fluid clutch to a locomotive crane. The folder shows how this unit automatically provides the correct torque in the exact amount needed to move the load, enabling the operator to move the load up and down fractions of an inch at a time, eliminates shock loading on gears and "slip-clutching" at full throttle to start heavy loads. *Orton Crane & Shovel Co.*

For free copy insert No. 3 on postcard.

Straight Chrome Stainless

To assist in solving the problem of substitutes for vital chrome-nickel stainless, a new 4-p. bulletin outlines the physical and mechanical characteristics of three non-hardening straight chromium stainless tubing steels. The folder includes technical data on analyses, creep strength, properties at room and elevated temperatures, corrosion and oxidation resistance, forging, forming, machining, welding and heat treatment. *Babcock & Wilcox Tube Co.*

For free copy insert No. 4 on postcard.

Vitrified Grinding Wheels

Facts about Bay State Koolpore abrasive products are detailed in a new 4-p. folder describing vitrified grinding wheels and segments, honeycombed with thousands of induced pores. Tool and cutter recommendations are given, and the bulletin explains how extra chip clearance obtained from these extra-open structures allows faster stock removal and cooler cutting action, contributing greatly to the economy of properly ground tools. *Bay State Abrasive Products Co.*

For free copy insert No. 5 on postcard.

Steam Platen Presses

A new 20-p. bulletin covers Baldwin standard and custom-built steam platen presses. It includes standard presses ranging from 20 x 20 in. to 84 x 222 in. platen size and from 100 to 12,500 tons capacity. Illustrations show the variety of types of presses made by this company, and specifications are listed for each type. *Baldwin-Lima-Hamilton Corp.*

For free copy insert No. 6 on postcard.

Aluminum Bridge Railings

Aluminum for bridge railings, a relatively new field for the metal and one in which practically no other technical information is available, is the subject of a new 50-p. manual designed to answer all engineering questions for architects and engineers. It analyzes the advantages of aluminum for this service and presents typical designs to show the possibilities in this field. Stress analysis data are included, as well as the relative cost structure. Complete design details are covered along with methods for assembly and surface treatment. *Reynolds Metals Co. Address requests on company letterhead to this column.*

Pivoted Blade Shears

Advantages of steelweld pivoted blade shears, incorporating easy knife adjustment, counteracting shear pressure, and the upper knife traveling in a circular path, are described in a new 8-p. catalog. The booklet lists clearance dimensions and specifications and illustrates the numerous features of the equipment. Several models are pictured. *Cleveland Crane & Engineering Co.*

For free copy insert No. 7 on postcard.

Instruction Films

Two full-color 16 mm sound films, designed to teach gaging fundamentals and modern gaging practice, are described in a 4-p. folder giving booking specifications for these educational moving picture presentations. The first, entitled "The Dial Indicator," runs for 20 min; the second, "Dial Indicator Gages," runs about 18 min. These Koda-

Turn to Page 122

NEW *production ideas*

new and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard.

Grinding Wheel Bushings

Light weight and size uniformity preserve inherent balance of wheels.

New precision bushings for grinding wheels are pressed into the wheels, a method of mounting said to insure greater holding power of the bushing within the wheel. The bushing maintains more consistent hole size from wheel to wheel with consequent advantages of uniform mounting conditions for the user. At the present time the bushing is being used in straight wheels of 5 to 8 in. diam. *Norton Co.*

For more data insert No. 20 on postcard.

Micro Drill Press

Designed for drilling holes 0.002 in.

Drills as small as 0.002 in. diam can be held in a proper size collet, on a new micro drill press, with the assurance that they will run true. The spindle is mounted in precision pre-loaded ball bearings. A 1/20 hp motor supplies the power and with standard pulleys spindle speeds of 1000, 1750 and 3000 rpm are available. Work is fed to the drill by raising the table which has travel of 1½ in. Greatest distance between the table and the end of the spindle is 4 in. *Louis Levin & Son, Inc.*

For more data insert No. 21 on postcard.

Attachments for Lapmaster

Roller bar and pneumatic lift facilitate loading and unloading.

Two special standard attachments for the Lapmaster speed production and simplify handling of certain types of parts. A roller bar attachment facilitates loading and unloading tall or large parts by using brackets mounted outside the circumference of the lap plate. Elongated slots allow adjustment of the conditioning ring holding brackets. Complete accessibility of the lap plate is afforded with this arrangement. Height of parts is unlimited and in most cases, large heavy castings lap of their own weight. When large numbers of small parts must be lapped, a pneumatic lift attachment will speed production by facilitating the loading and removal of parts and workholders. Each conditioning ring and pressure plate unit is individually raised by a pneumatic lift. *Crane Packing Co.*

For more data insert No. 22 on postcard.

Mobile Work Tower

Reaches equipment 22-23 ft high; tower telescopes to clear doors.

Controlled by a foot-operated lever on the platform, a new electro-hydraulic work tower can be quickly raised to permit reaching equipment or ceilings 22-23 ft high. No connection to an electric outlet is required. The telescoping tower is easily rolled anywhere and locked in the working position. The work platform is elevated through exten-

use postcard below

Postcard valid for eight weeks only. Information may be secured subsequently by separate letters fully describing each item wanted, including company name.

FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE
100 E. 42nd St.
NEW YORK 17, N. Y.

production ideas

Continued

sion of a hydraulic ram with the hydraulic pump operated by a battery-powered electric motor. A 6-v automotive storage battery may be employed. The loaded platform may be raised from its retracted height of 7 ft to the maximum 17 ft above the floor in 25 sec. *Safway Steel Products, Inc.*

For more data insert No. 23 on postcard.

Induction Regulators

Self-cooled and forced-air-cooled, in 10, 20 pct ranges of regulation.

A new line of three-phase, dry-type, induction voltage regulators meet the industrial demand for regulated three-phase power at low voltages. Regulators are offered in ratings from 120 to 600 v and from 12 to 85 kva. These units do not entirely replace the Triplex assemblies, which consist essentially of three single-phase regulators on a single base. The new arrangement of three-phase winding on a single core is said to make a considerable saving for users of three-phase voltage regulators, in the ratings being offered. *General Electric Co.*

For more data insert No. 24 on postcard.

Cast Iron Welding Rod

Recommended as general purpose for both salvage and production.

Using less of the critical materials, a new cast iron gas welding and brazing rod can be substituted for nickel-base welding alloys. No. 3 is said to flow out readily, make a denser deposit, and is more easily machined. Its copper coating prevents rusting and enhances flow characteristics. Tensile strength is up to 48,000 psi. Brinell hardness; 170-200. It is color-matching and has a working temperature of 1400-1500°F. *All-State Welding Alloys Co., Inc.*

For more data insert No. 25 on postcard.

Plating Brighteners

For use in zinc or cadmium plating.

The series includes three specially developed materials, all adaptable to any type of electroplating equipment. Advantages are better throwing power, increased solution efficiency and uniform coverage. For zinc plating, the line has two brighteners: ARP No. 5, good in low current density ranges and capable of producing bright plate with a blue chrome-type cast directly from the plating solution. No. 3 operates in higher current densities and produces a zinc plate with a bright yellow nickel type cast. For cadmium plating, ARP No. 4 operates throughout any current density and produces a silvery bright plate. All brighteners are organic in nature. *Allied Research Products, Inc.*

For more data insert No. 26 on postcard.

Electric Chain Hoist

For efficient, fast action lifting.

Designed for hook suspension, a new electric chain hoist is adaptable for trolley mounting with the R&M Bulldog trolley. Constructed of high strength cast aluminum alloy with heat-treated gearing and high carbon or alloy steel ground shafts, the Type JC hoist is equipped with precision ball bearings. The gear train is enclosed in an air-tight case and operates in an oil bath. A link type steel chain, single for 500 and 1000-lb capacity hoists, double for 2000-lb capacity, provides a natural, flexible lift; assures safe, dependable hoisting. *Robbins & Myers, Inc.*

For more data insert No. 27 on postcard.

Bake Enamel for Metals

High degree of heat resistance; chemical, solvent, mar resistant.

A new baking enamel that can be used for a wide variety of metal objects subjected to heat while in use, adheres to steel, aluminum, brass, chrome plate, gold and silver. It is non-yellowing, and is available in all colors and in full gloss, semi-gloss and flat finishes. Base Y2323 is applied by spray or dip process. *United Lacquer Mfg. Corp.*

For more data insert No. 28 on postcard.

Overload Warning Signal

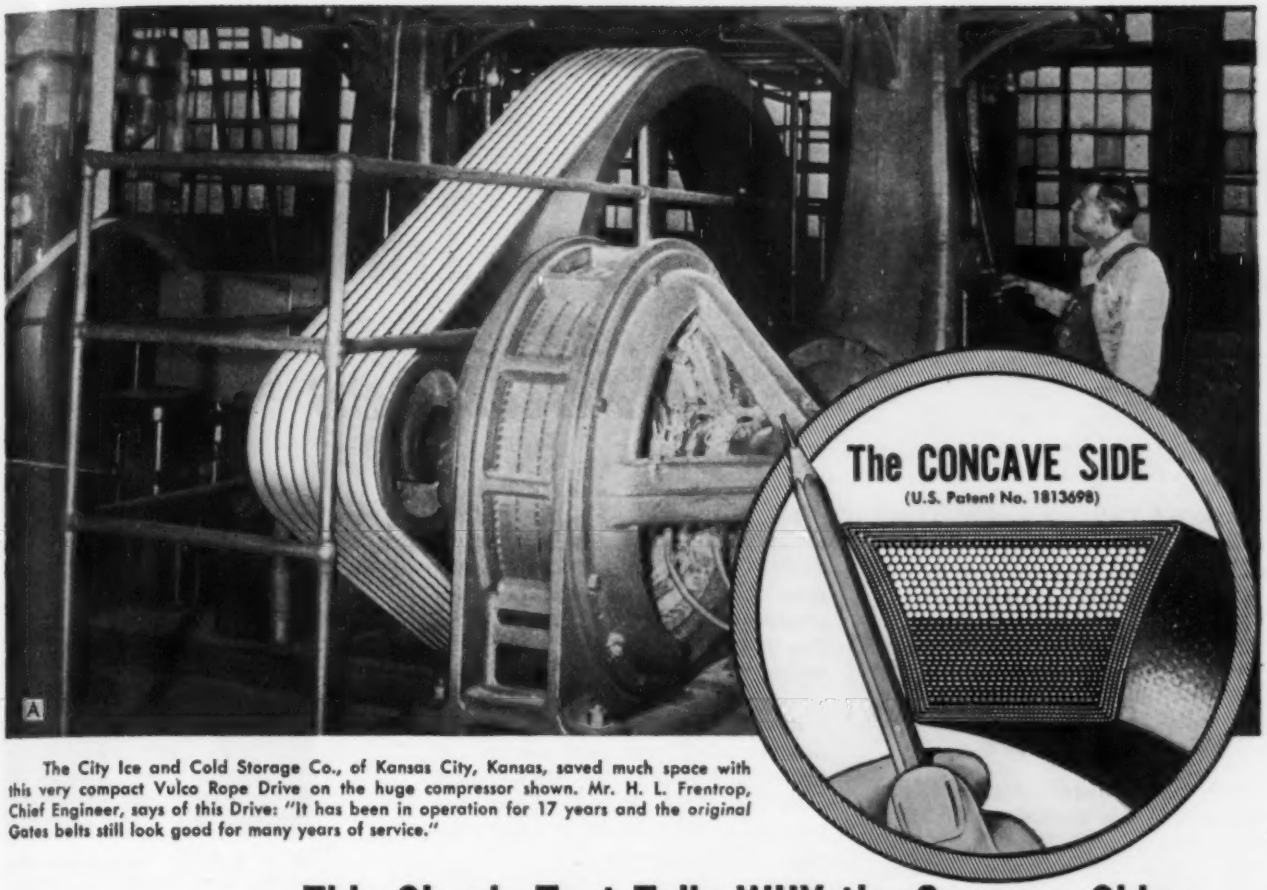
Visible, audible, to protect hoists and cranes, and life.

A companion unit to the Dyna-Switch that cuts off a hoist motor, is a new overload signal that combines a self-contained warning klaxon, light and batteries. It con-

use postcard below

Postcard valid for eight weeks only. Information may be secured subsequently by separate letters fully describing each item wanted, including company name.

Name ..... Title ..... Company ..... Co. Address .... THE IRON AGE, New York 17	3/8/51 ☐ Fill in above the number of the item on which you need further data.
Name ..... Title ..... Company ..... Co. Address .... THE IRON AGE, New York 17	3/8/51 ☐ Fill in above the number of the item on which you need further data.
Name ..... Title ..... Company ..... Co. Address .... THE IRON AGE, New York 17	3/8/51 ☐ Fill in above the number of the item on which you need further data.
Name ..... Title ..... Company ..... Co. Address .... THE IRON AGE, New York 17	3/8/51 ☐ Fill in above the number of the item on which you need further data.



The City Ice and Cold Storage Co., of Kansas City, Kansas, saved much space with this very compact Vulco Rope Drive on the huge compressor shown. Mr. H. L. Frentrop, Chief Engineer, says of this Drive: "It has been in operation for 17 years and the *original* Gates belts still look good for many years of service."

This Simple Test Tells WHY the Concave Sides of Gates Vulco Ropes Mean *Longer Belt Life!*

Prove this *yourself*—in two minutes' time.

Take any V-belt that has *straight* sides. *Bend* that V-belt while you grip its sides between your fingers and your thumb. You will *feel* the sides of the belt *bulge out*—as shown in figure 1-A, below.

Clearly, that outbulge forces the sides of the belt to press *unevenly* against the V-pulley—and this concentrates the *wear* where the bulge is greatest.

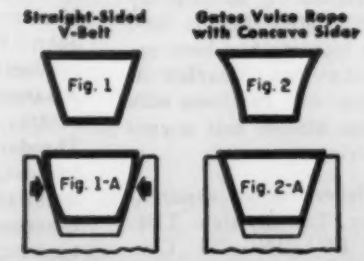
Now, make the same test with the belt that is built with the Concave Sides—the Gates Vulco Rope.

Figures 2 and 2-A show clearly what happens when you bend a Vulco Rope. Instead of *bulging*, the precisely engineered Concave Sides merely *fill out* and become perfectly straight. There is no side-bulge. This belt, when bent, precisely fits its sheave groove.

Because there is *no bulging*, the sides of the Gates Vulco Rope always grip the *full* face of the V-pulley *evenly* and therefore wear *uniformly*—resulting in *longer belt life* and *lower belt costs for you.*

Only V-belts made by Gates are built with concave sides. Whenever you buy V-belts, be sure that you get the V-belt with the Concave Sides—The Gates Vulco Rope!

What Happens When a V-Belt Bends



How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill Out to a Precise Fit in the Sheave-Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

CS-511

THE GATES RUBBER COMPANY
DENVER, U. S. A.
The World's Largest Makers of V-Belts

Gates VULCO ROPE DRIVES
Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

IRON AGE *introduces*

Donald J. Finlayson, appointed manager of the merchandise division of the BRIDGEPORT BRASS CO., Bridgeport, Conn.

Calvin E. A. Solla, joined the sales force of the HANSON-VAN WINKLE-MUNNING CO., Matawan, N. J. **Herbert W. Marx** has also joined the sales force of the company.

William R. Rogers, transferred to the Philadelphia district sales office of the CARBORUNDUM CO., Bristol, Pa., to act as refractories engineer, from the refractories division of the company at Perth Amboy, N. J.

A. G. Postlethwait, elected vice-president of the LORD MFG. CO., Erie, Pa. Mr. Postlethwait's election fills the office which has been vacant since 1946.

Roy E. Carter, named vice-president in charge of engineering for FURNACE ENGINEERS, INC., Pittsburgh.

Olive W. Dennis, retired as research engineer for the BALTIMORE & OHIO RR, Baltimore. Joining the company in 1920 Miss Dennis held positions which hitherto had been exclusively held by men. **Charles A. Rausch,** secretary, who has been with the company for almost half a century is also retiring.

Richard C. Baker, named assistant to the treasurer, Tax division, TIMKEN ROLLER BEARING CO., Canton, Ohio.

Frederick W. Thomas, appointed director of purchases, and **George R. Fox,** appointed assistant vice-president in charge of the plant expansion program, of the JOY MFG. CO., Pittsburgh.

Edward A. Ledeen, appointed chief engineer of the FEDERAL STEEL WAREHOUSE CORP., Dayton.

Joe Hart, appointed manager of the metal processing sales division of TURCO PRODUCTS, INC., Los Angeles. **Lou H. Moulton,** retired as vice-president and national sales director. **Dan T. Buist** succeeds Mr. Moulton as national sales director.

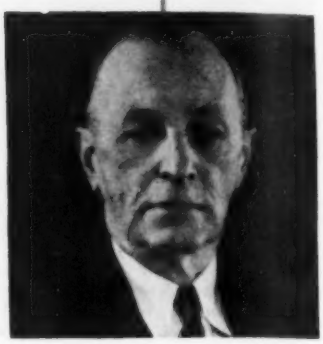
Robert W. Conder, appointed to a newly-created post as director of industrial relations of CHRYSLER CORP., Detroit. **John D. Leary** has been appointed director of labor relations of the company.

Dr. Martin A. Edwards, appointed engineering manager, general engineering laboratory of the GENERAL ELECTRIC CO., Schenectady, N. Y. **Earl F. Arnett,** appointed in charge of the Pittsfield chemical process development section. **Robert L. Teeter** was appointed manufacturing engineer and **Alfred R. LaCasse** was named manufacturing analyst for the chemicals division.

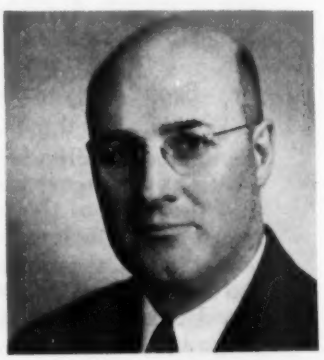
Amos C. Bledsoe, appointed division superintendent, sheet and tin, of the Fairless Works of U. S. STEEL CO., Morrisville, Pa. Other appointees: **John F. Brownlee,** superintendent, production planning; **Kermit L. Johannsen,** division superintendent, central maintenance and utilities; **Theodore J. Loenig,** division superintendent, rolling; **Fred B. Lafferty, Jr.,** superintendent, industrial relations; **Emerson R. Miller,** division superintendent, blast furnaces, coke ovens and by-products; **Maynard J. Rich,** plant industrial engineer; **Lester R. Walker,** chief metallurgist and inspector.

William F. Lutz and **Lawrence A. Eckel,** appointed to new positions on the manufacturing staff, elevator division of WESTINGHOUSE ELECTRIC CORP., Jersey City, N. J.

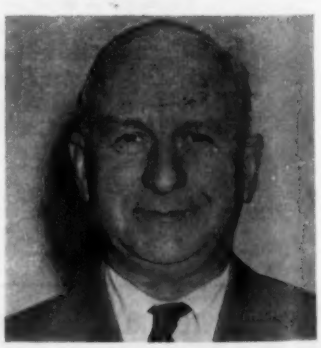
Turn to Page 70



M. S. RAMSEY, elected president of the Moto-Mower Co., Detroit. Mr. Ramsey is one of the original employees of the company.



W. A. MORTON, elected president of the Loftus Engineering Corp., Pittsburgh.



R. A. J. WELLINGTON, elevated to vice-president in charge of sales by Precision Metalsmiths, Inc., Cleveland.

IRON AGE

salutes

K. T. Keller

TOUGH, hard-hitting K. T. Keller, chairman of the board of Chrysler Corp., recently got a new job—director of the nation's guided missile program.

Taking on new duties is an old story for Mr. Keller. In 41 years with the auto industry he's held a lot of jobs from lowest to highest. A firm believer in learning business from the ground up, he gave up pencil-pushing at 21 to become a machine shop apprentice.

In his early days, he gyrated from one motor car shop to another—absorbing vital production know-how. Hitting production problems squarely, he forged his way upward. The one-time farm boy held successively bigger and more responsible executive jobs.

In 1926 he left GM to join Walter P. Chrysler as vice-president in charge of manufacturing in the new company Chrysler formed from the auction purchase of Chalmers and Maxwell. In 1935 he was made president of the Chrysler Corp.

For his work in World War II, Mr. Keller won the Distinguished Service Certificate of the Army Ordnance Dept., and the Medal of Merit of the American Ordnance Assn. In less than a year he had bulldozed the Detroit Tank Arsenal from planning to production stage.

K. T. Keller ruled Chrysler with hard common sense—in shop practice, in engineering, and in finances. When he stepped out of the presidency last November, the company was in the best financial position in 15 years.

Mr. Keller's wide range of interests include golf, bridge, chess and boating.

JAMES M. BAKER, appointed vice-president in charge of manufacturing of the Weatherhead Co., Cleveland.

MARVIN J. BAIR, elected vice-president in charge of sales of the Thomas Steel Co., Warren, Ohio.

EARL G. STEGEMILLER, elected assistant treasurer of Armco Steel Corp., Middletown, Ohio.

H. N. MAY, appointed chief of material for Consolidated Vultee Aircraft Corp., San Diego division.

IRON AGE *introduces*

Continued

S. Frederick Magis, elected general manager for SIDERURGICA VENEZOLANA "SIVENSA" S. A., Caracas, Venezuela.

Fred A. Locke, appointed assistant general superintendent of the Braeburn, Pa. plant of BRAEBURN ALLOY STEEL CORP.

Donald A. Campbell, joined the ECLIPSE FUEL ENGINEERING CO., Rockford, Ill., as vice-president in charge of engineering and research.

M. A. Straub, named sales manager of the Norge Heat Division of BORG-WARNER CORP., Chicago.

Harold J. Bartlett, appointed sales manager for ALLOY STEEL PRODUCTS CO., Linden, N. J.

V. R. "Dick" Peiffer, appointed director of production of the Warner division, CLINTON MACHINE CO., Detroit. Carl L. Kalitta named chief design engineer.

Fred C. Poppe, appointed advertising manager of the Philadelphia division of the YALE & TOWNE MFG. CO.

Robert L. Williamson, named product manager in charge of the sale of die castings for ALUMINUM COMPANY OF AMERICA, Pittsburgh. **Rodney M. Beck** succeeds Mr. Williamson as manager of the Kansas City district sales office.

Walter C. Keil, appointed assistant superintendent in charge of smelting operations Federated Metals Div. of the AMERICAN SMELTING & REFINING CO., Newark, N. J. **Joseph D. Allen, Jr.,** named assistant superintendent in charge of manufacturing.

Harold S. Sizer, appointed director of design for machine tools of the BROWN & SHARPE MFG. CO., Providence. Mr. Sizer will assume charge of engineering on machine tools and related items.

Thomas Cornils, appointed chief engineer for the Pacific Northwestern division, of the LINK-BELT CO., with headquarters at the company's plant in Seattle.

William F. Bernart, elected to the board of directors of PITNEY-BOWES, INC., Stamford, Conn. Mr. Bernart is executive vice-president of the company.

B. E. David, appointed district manager for ARCOS CORP., Los Angeles.

R. F. Chaffin, appointed electrical engineer for all plants of CRUCIBLE STEEL CO., Pittsburh. **R. S. Hurtt** succeeds Mr. Chaffin as superintendent of electrical maintenance department at Midland Works and **John F. Kostelac** succeeds Mr. Hurtt as assistant superintendent.

Robert A. Parks, appointed Washington, D. C. representative for the RIGIDIZED METALS CORP., Buffalo.

Donald S. Graham, joined the sales development department of CUMMINS ENGINE CO., INC., Columbus, Ind. Mr. Graham's duties will include editing the house organ and the preparation of general publicity for the company.

OBITUARIES

Glenn W. Christopher, 64, manager of standard pipe sales for Youngstown Sheet & Tube Co., Youngstown, Ohio, died recently.

Earl L. Kremer, associated with the Lake City Malleable Co., Cleveland, died recently.

John A. "Jack" Sherry, 52, regional sales manager for the Perfect Circle Corp., Indianapolis, died recently.

Russell L. Peck, refractories engineer for Norton Co., was killed in an automobile accident in Tallulah, La., recently.

Harry Freedman, founder of the Woodmere Scrap Iron & Metal Co., Detroit, died recently.

Harry C. Jones, superintendent of the mechanical department of Republic Steel Corp.'s Cleveland plant, died recently.

Herman B. Van Hook, 57, casualty manager of American Bridge Co., Pittsburgh, died recently.

Leo R. Meyer, president of the Inter-State Foundry Co., Indianapolis, died recently at the age of 65.

Fred M. Zeder, a vice chairman of Chrysler Corp., Detroit, since its founding, died recently.

Nic Krump, 76, original partner in the firm of Dreis & Krump Mfg Co., Chicago, died recently.

Now, more than ever before, America must make full use of its steel-making capacity and conserve its natural resources. Now, more than ever, there is national significance in the phrases, *"Make a ton of sheet steel go farther"* and *"Make your product last longer."*

These low-alloy, high-tensile steels do "make a ton of sheet steel go farther"—for their inherently higher strength is 50% greater than mild carbon steel. That means, in turn, that 25% less section can be used with safety, and where rigidity is important, this can usually be compensated for through slight design change.

"Make your product last longer" is no idle claim. The much greater resistance of N-A-X HIGH-TENSILE to corrosion, abrasion, and fatigue assures longer lasting products even at reduced thickness.

Explore the potential economies to be derived from the use of low-alloy, high-strength steels—and then specify them. Their use can add materially to our national conservation program.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division, Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

on the assembly line

automotive news and opinions

Subcontracting will control defense . . . GM lists $3 million backlog . . . Tungsten carbide capacity increased.

by Walter G. Patton

Auto Price Rise — As expected (THE IRON AGE, Jan. 25, 1951, p. 44), auto producers got a price boost last week. It would be generous to say Washington gave them half of what they were asking. The increase is 3½ pct. The government order issued last December forestalled price advances of 5 to 7 pct. The new increase applies to wholesale prices only (roughly 75 pct of the retail price).

Still Not Enough—Response of the industry to the new pricing order has been favorable but restrained. Many industry leaders argue this is still not enough to bail them out of the hole they were pushed into by the government price freeze. The first new price announcement coming in the wake of the relaxation order is expected to be the new Olds Super 88.

GM Head Approves—The recent government wage move was deemed the proper one by C. E. Wilson, GM president, who immediately wired Eric A. Johnston, administrator of ECA to this effect. Wilson was pleased that his escalator-type wage contracts can be preserved, temporarily at least. In addition to eliminating annual strikes in some industries, Wilson believes the GM-type contracts greatly encourage employee cooperation in the use of better processing and better tools.

Cornerstone of Defense—Key to the defense effort is subcontracting. Few people realize, for example, that 56¢ out of every dollar received by the automotive industry for World War II orders went to subcontractors and vendors. About 63 pct of the companies involved were small business, employing less than 500 people.

According to AMA, in an actual World War II case involving production of four different types of cannon, only 12 parts of the four weapons were made by the automobile companies. The remaining 757 parts (93.4 pct) were made by 137 different firms located in 58 cities and 10 states.

Heavy Majority — Another example: During World War II, 93 out of 103 parts of an anti-aircraft gun were furnished by subcontractors. Sixty percent of 3719 parts of a tank were furnished by subcontractors. Approximately 98 pct of 5112 parts of an aerial torpedo were subcontracted.

How to Ungarble — When a Washington order doesn't make sense, it should be tested on the theory that the action is being taken to bring subcontractors into defense work. The economics of the situation are simple. Many small firms have been making 10 to 15 pct or more on their investment. They expect their earnings will be limited again on government defense work by renegotiation.

More Incentive Needed — While most business managers are patriotic, they also have a responsibility for the long-term conduct of a business. A decision to take on a war contract is not easy. Such decisions must be made by the tens of thousands before the defense effort gets into high gear. One of Washington's biggest jobs is to make it more attractive or absolutely necessary for small business to take on defense work and put wings on rearmament.

GM Defense Load — The growing momentum of the defense program was indicated by an announcement this week by General Motors that defense orders now on GM books total $3 billion. Quantity production on most projects will not begin in 1951. About two-thirds of the total has been assigned since Dec. 16, 1950.

The growing GM defense load is distributed as follows: Aircraft propellers, bombsights, navigational instruments, Diesel engines and Allison jet engines, 35 pct. Products similar to civilian production—trucks, staff cars, ball and roller bearings and electrical equipment, 10 pct. Tanks, planes, guns, projectile and Sapphire jet engines make up the biggest total, 55 pct. These latter will have to be made either

assembly line

Continued

in new plants or in converted GM plants. Volume production cannot be reached for many months, GM observed.

Split in Operations — Available evidence all points to the fact that defense production is being set up separate from civilian production. Last week Chevrolet appointed B. D. Marshall, manager of defense manufacturing plants. These include Chevrolet Aviation plant No. 1 at Tonawanda, N. Y. (where the company produced aircraft engines during World War II, including some jets).

Marshall will also be in charge of the new shell plant Chevrolet is opening in St. Louis. He has been assistant manager of the Flint manufacturing division. His new responsibilities will include all Chevrolet plants on defense work.

Clue to Shortage — If the critical alloy shortage (THE IRON AGE, Mar. 1, p. 92) comes as a surprise, a look in the direction of the jet engine program provides an answer. Now building or preparing to build jets are the following: Buick, Chevrolet - Tonawanda, Chrysler, Pratt & Whitney, Curtiss-Wright and Allison. Packard, Ford and Studebaker may soon join this group. Quantities contemplated for the all-out jet program are astronomical.

Records Prove Handy — In all General Motors divisions careful records have been kept on processing and tooling for products produced during World War II. Chevrolet has developed a number of new techniques, including some special forging techniques, that may be very helpful in attaining high jet engine output. These techniques were tried briefly during the end of World War II.

The Chevrolet-Tonawanda plant is equipped with three jet test cells. Even the problem of testing a jet engine is far from simple. In addition to heat and power problems, the acoustical problem requires special attention to muffle the roar.

Chevvy Jet Engine — The new jet engine to be built by Chevrolet is the J-35-A23 developed by Allison. This engine has been under development since 1949. One advantage of the new design is a substantial reduction in fuel consumption. Both Allison and Chevrolet will build the new type engines. It is believed that Chevrolet production will be the largest. Allison will continue to build earlier model jets as well as the J-33 turbo jet engine which powers the F 80 Shooting Star, F 94 all-weather fighter and the Grumman F-3 Panther.

Engines for Tanks—Little public attention has been given, thus far, to rebuilding replacement engines for M-24 light tanks. For this purpose, Cadillac is starting production of the Cadillac power train, consisting of two Cadillac engines and a Hydra-Matic transmission driving a tank through a specially-designed transmission unit. From March 1942 until October 1945 Cadillac built 12,227 M 5 and M 24 light tank power trains.

Damaging Effects — Carbide projectiles were effectively used against the German Panther tanks. There are unconfirmed reports that the Germans were able to sink British warships during World War II because they used tungsten carbide projectiles.

Carboloy is adding 13,000 sq ft of production capacity at Detroit. A new $2 million plant will be built at Edmore, Mich., 23 miles west of Alma. Population of Edmore is about 1000.

Fred Zeder, Chrysler

Detroit—The death of Fred Zeder, Chrysler vice chairman, brings to a close one of the most colorful careers in the automobile industry. It is generally conceded that sound engineering has always been one of Chrysler's greatest assets. Fred Zeder, Owen Skelton and Carl Breer introduced the first so-called high compression engine back in 1924.

They went on from there to build an engineering organization that ranks with the very best in the industry. Chrysler and the industry will miss Fred Zeder's genius for organization and his outstanding ability to sell and promote engineering ideas.

THE BULL OF THE WOODS — **By J. R. Williams**

IT'S THAT BLOOMIN' LEG AGAIN! WELL, I'VE HAD A GOOD LIFE!
YES, DAVIE, SO HAVE I! IT'S BEEN GREAT-- FROM 30-TON CRANES TO 500-TON CRANES!
EVERY TIME THEY GET A COLD THEY TALK LIKE IT'S TH' LAST ONE! I'VE HEARD THAT FOR YEARS!
THEY WON'T EVEN STAY AT HOME WITH IT-- THEY'RE AFRAID WE'LL GET TOO MUCH PRACTICE AT GETTIN' ALONG WITHOUT 'EM!
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J.R.WILLIAMS
THE HANGERS ON
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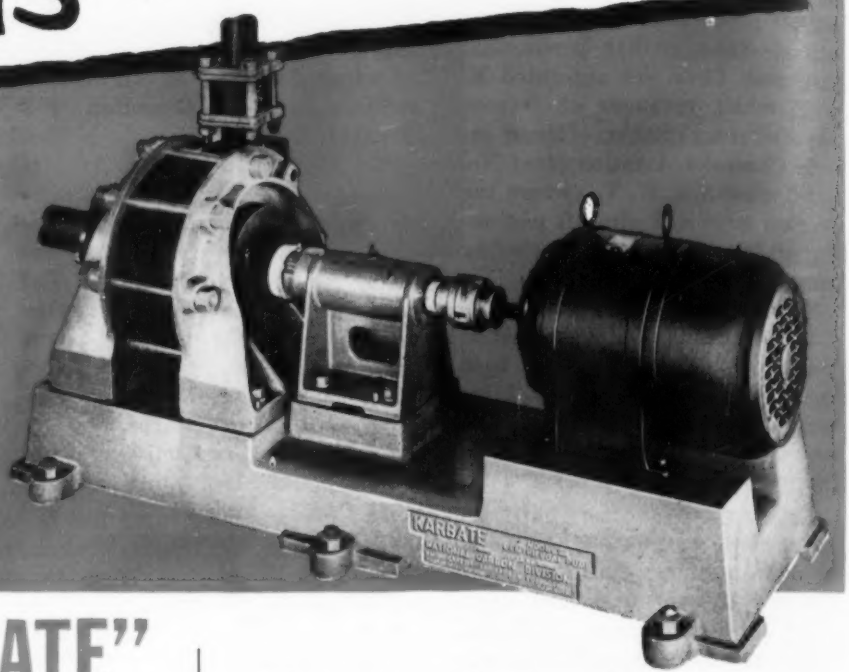
not only by—REDUCED PRICES

but also thru—

LOWER MAINTENANCE COST

To the savings made by the reduction in "Karbate" brand impervious graphite pump prices (up to 33%), add the all-important factor of *very low annual maintenance cost.* Our records show some pumps in service for years, requiring practically no replacement parts.



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Impervious Graphite Corrosion Resistant

PUMPS

HERE'S WHY—

- Case and Impeller are of "Karbate" impervious graphite – they do not corrode.
- Stainless Steel Shaft, where exposed to corrosive fluids, protected by "Karbate" impervious graphite.
- "Karbate" impervious graphite rotary seals* are regular equipment – included in basic pump price. They are not "extras".
- No stuffing gland to require packing – a single, occasional adjustment of the "Karbate" rotary seal replaces this cost.

Other NATIONAL CARBON *products*

*Now, even at new low pump prices, "Karbate" rotary seals have been improved. Teflon is used to gasket the seal to the shaft and the gasket is adjusted, independently of pressure, on the seal faces.

OTHER FEATURES:

- All-purpose application
- Freedom from product contamination
- Excellent corrosion resistance
- Rugged construction
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The term "Karbate" is a registered trade-mark of

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west coast progress report

digest of far west industrial activity

by R.T.Reinhardt

Bethlehem Pacific Spreading Out — Bethlehem Pacific Coast Steel Corp. has begun an expansion program in the Los Angeles area that is expected to exceed $5 million. Another $350,000 reportedly will be invested in the South San Francisco plant area.

At L. A., installation of the 75-ton furnace previously announced is included and property deals recently made include purchase of the Baker Oil Tool Co. Other property purchased in the immediate area is the former Kinney Aluminum Works.

Room to Move—Bethlehem Pacific has been cramped for space and the current purchases indicate probable increases in finishing facilities. Additional purchases could make all properties abut. Further indication that Bethlehem expects to use this property for expansion is the company's recent refusal to release any part of their holdings to a nearby company stating that present plans call for dismantling of the buildings and new construction later.

GE Gives Up All Hope—Unable to come to terms with United Electrical, Radio & Machine Workers of America (UE Independent), after a 140-day strike, General Electric Co. last week announced it was abandoning operation of its transformer plant in Oakland, Calif., and offering the production facilities for sale.

Back in Blast — One of three blast furnaces at Geneva Steel Co. in Utah which has been down for the past 6 weeks for repairs was back into production last week.

Construction has started on new openhearth furnaces at Geneva by the F. H. McGraw Co. which is doing the excavation and foundation work. It is expected that the openhearths will be put into production in approximately 1 year.

Coke Relief?—If results achieved in laboratory production are equalled in quantity production, a carbon fuel developed by the U. S. Bureau of Mines laboratory in Albany, Ore., in cooperation with the Portland Gas & Coke Co. may be a solution to the western coke shortage.

According to Dr. John P. Walsted, the carbon product can be substituted for coal coke in foundry use. Portland foundries have cooperated in experimenting with this new source of fuel and reported favorably on its characteristics.

More Zirconium—A third plant for production of zirconium is to be constructed by the Bureau of Mines at Albany, Ore., and is scheduled to be in production within 3 months. The unit will cost $90,000, it is announced.

Harvey Complete Surveys—Harvey Machine Co., Torrance, Calif., has completed its survey in the Northwest area for a site for its proposed $20 million bauxite plant. The company is looking for approximately 250 acres on deep water for the operation involving handling of large quantities of imported bauxite.

Harvey is negotiating with Blythe & Co. to handle financial arrangements covering an aluminum reduction plant, for which a certificate of necessity has been issued and is now under construction near Kalispell, Mont., and the proposed alumina plant.

Bauxite Production Planned—A group of Portland, Ore., people have filed 100 mining claims in Josephine County, Ore., which cover approximately 2000 acres 15 miles west of Grants Pass, Ore., to supply bauxite to aluminum producers.

The deposits are said to contain from 22 to 52 pct alumina, but according to the Oregon State Dept. of Geology, high alumina clays are to be found in more accessible regions which carry approximately 35 pct alumina and as much as 25 pct iron. Accessibility of ores is pointed up as a strong factor influencing location of mines.

Cut Production Costs

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HIGH SPEED STEELS
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✻ FULL UNIFORMITY

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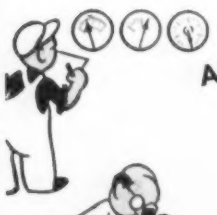
CONSISTENT MELTING PROCESSES



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RIGID INSPECTION PRACTICES

Latrobe's Desegatized Brand high speed steels and hi carbon - hi chrome die steels will help you cut production costs. Rigorous quality control - from material selection through product inspection - plus the full uniformity found in all Desegatized Brand steels assures better tool and die performance and longer production life.

In Desegatized Brand steels, the all-important carbide particles are evenly distributed throughout the entire cross section - NO HARMFUL CARBIDE SEGREGATES ARE PRESENT! This results in extra toughness and strength . . . cracks, checks and warpage in heat treatment are radically minimized . . . superior machining and grinding abilities result.

Specify Latrobe's Desegatized Brand tool and die steels for better performance and resulting lower production costs.

Send for booklet "WHY DESEGATIZED" showing superiority of Desegatized Brand steels over average standard process steels.

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Branch Offices and Warehouses located in: DETROIT, TOLEDO, DAYTON, PITTSBURGH, LOS ANGELES, PHILADELPHIA, CHICAGO, CLEVELAND, NEW YORK, BOSTON, SEATTLE, MILWAUKEE, HARTFORD, ST. LOUIS, BUFFALO.

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the federal view

this week in washington

by Eugene J. Hardy

End DO Limitations—Munitions Board Chairman John D. Small has asked NPA to remove all provisions in control orders which limit the required acceptance of DO ratings. Key materials covered by such a limitation include steel, aluminum, and copper.

Purpose of these percentage limits is to insure equitable distribution and prevent overloading of a few producers with rated orders. The Munitions Board request stems from reports from military procurement officers of materials shortages, principally steel, aluminum and zinc, causing delays in deliveries of some defense items.

Among the items reported as being delayed by shortages are M-46 tanks, 37 mm shells, tank tracks, rockets, tactical trucks, tanker and destroyer escort conversions, alloy pistons and dies.

More Funds for Defense Loans—President Truman has asked Congress for another $1 billion in borrowing authority to carry out the expansion provisions of the Defense Production Act. This money may be used for direct loans, purchase agreements, loan guarantees, and equipment and facilities installations. Originally, $600 million had been appropriated for these purposes, and an additional sum had been authorized but not appropriated. Most of the $600 million has been used up and another $1 billion is needed until June 30.

The President also wants an additional $51 million to finance materials, wage and price, and credit controls. The original $30 million will carry the control agencies, NPA, ESA, OPS, etc., through the end of March and the additional funds are needed for operating purposes until June 30.

New Project—The Bureau of Mines has asked for $750,000 to operate a pilot plant for conducting research on the recovery of alumina from anorthosite rock and clay. Objective is to extend domestic reserves, provide an adequate and dependable source of raw material for the aluminum industry, and decrease dependence on foreign supplies.

No More Certificates—Defense Mobilizer C. E. Wilson's decision to call a halt to approving "certificates of necessity" for steel expansion (see p. 110) will undoubtedly evoke much protest from Capitol Hill. With an estimated 8 million tons of ingot capacity covered by pending applications, many a Congressman's pet project is going by the boards.

Two projects in the Far West, among those pending, were to be the subject of elegant publicity for the Senators if approved.

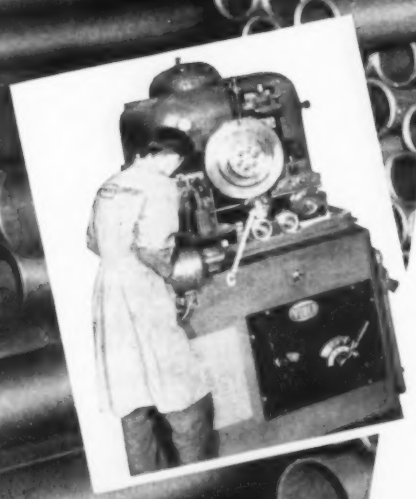
Politics in Steel—While Mr. Wilson stated that adequate supplies from existing expansion and possible shortages of steelmaking materials were his reasons for halting the program, there were others.

THE IRON AGE has learned that some of the pending applications were based more on political than on economic considerations and could only be justified because someone on Capitol Hill was interested. A number of these would have required heavy government financing before construction could be started.

Fringe Benefits—Industry is probably facing increased demands for bigger and better health, pension and similar fringe benefits—wide open to a renewed drive by labor. Stabilization chief Eric Johnston feels that such agreements do not add to purchasing power and inflation and the Wage Stabilization Board will approve most such new agreements "within limits."

Latest figures compiled by the Bureau of Labor Statistics indicate that 80 pct of pension and 60 pct of health and welfare programs are financed solely by the employer. This means that business for the most part would have to absorb the cost of any such new agreements, thereby decreasing the margin between cost and ceiling prices.

Quality and Speed do make it pay making pipe and tubing "The Yoder Way"



The fine finish, cleanliness, light weight, strength, ease of fabrication and low cost of tubing made the Yoder way spell SALEABILITY, in big letters. That's why more and more manufacturers are constantly finding new uses for tubing in their product designs.

In a little over ten years, the products of Yoder tube mills have found their way to every country on the Globe, and Yoder tube mills, at home and abroad, turn out billions of feet every year, in sizes from ¼" up to 20" dia.

Low first cost, compactness, simplicity of operation, and high production, are features of Yoder electric-weld tube mills which make the investment highly attractive. Because of multiplying uses, the market for tubing has been and still is expanding more rapidly than the supply. A surprisingly large number of operators, since installing their first Yoder mill, have added others. 34 owners now operate a total of 90 Yoder mills.

Whether you contemplate making pipe or tubing for resale or for your own use, send for 68-page Book of information on the mechanics as well as the economics of making it "the Yoder Way."

Consultations and Estimates without obligation on your part . . .

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PORCELAIN ENAMEL

. . . stronger than you think

Contrary to popular opinion, porcelain enamel will not crack or chip from steel until the yield point of the base metal is reached or exceeded. It fails only after a certain amount of strain, which has no relation to the strength of the metal.

Porcelain enamel is delicate; it chips easily. Or so runs the popular belief. That belief is false. To discredit it, enamelers have devised spectacular demonstrations like that shown on this page. Back of these ingenious exhibits are some facts which many enamelers have not been aware of.

One of the most important properties of porcelain enameled steel is, of course, adherence or bond between the enamel layer and the steel. Although the development of this adherence is thought to be more chemical than physical in nature[1 to 6] only the physical aspects will be considered here. Fig. 1 shows porcelain enameled panels which have been deformed to chip off the enamel and show the enamel-steel interface. That at the left shows good adherence: The dark color in the fractured area is caused by fragments of fractured glass adhering tenaciously to the base metal.

Fig. 1, right, shows that when the adherence is poor, the enamel separates from the base, leaving shiny, glass-free metal exposed. To obtain good adherence, three things are necessary. First, the base metal must be chemically clean so that the enamel slip will readily wet the steel surface. Secondly, the ground coat (the glass-coating next to the base metal) must contain an adherence-promoting oxide. The role of this adherence-promoting component has been the subject of much research and several theories explaining its functions have been proposed.[1 to 6] Suffice it to say for this discussion, this added material has some chemical or physico-chemical property which promotes the adherence of enamel to the base metal.

Rough Surface Is Needed

The third factor which contributes to the enamel-to-steel bond is the roughness of the steel surface. Other things being equal, enamel will develop better adherence on a rough surface than on a smooth surface. Fig. 2 shows the effect of surface roughness of the base metal on adherence. The steel plate at the right was prepared for enameling by pickling, while the plate at the left was prepared by sandblasting and had a much rougher surface than the pickled plate. Both pieces were coated with titanium-type porcelain enamel, applied directly to the steel. No ground coat was used. The adherence on both pieces was poor because of the lack of adherence-promoting oxides in the enamel layer, but it is obvious that the piece

By W. A. DERINGER, *Director of Ceramic Research*
A. O. Smith Corp., *Milwaukee*

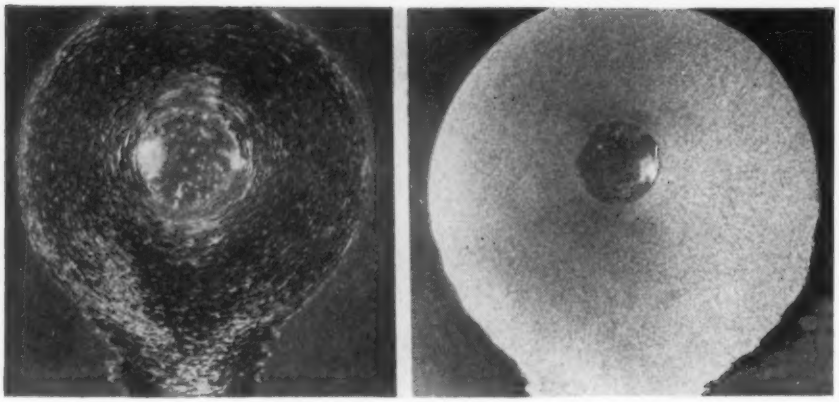


FIG. 1—Enameled parts deformed to show difference between good adherence (left) and poor adherence (right) of porcelain enamel to steel. Dark area at left is made up of fractured glass fragments adhering to base metal.

with the rough surface had the better adherence.

When the adherence is quite poor (the specimens at the right in Figs. 1 and 2) the enamel may separate from the base metal without any deflection or deformation of the steel. At times the enamel may separate from the steel in large sheets, while at other times it may raise off in small areas called "splotches." These frequently break off and expose the metal below.[5]

So, it is obviously important that the enamel have good adherence to the steel. It is also assumed in this investigation of the tensile properties of enameled steel, that the total stress in the enamel layer is negligible because in all cases the enamel layer was not over 0.006 in. thick while the steel tensile bars were 0.10 to 0.25 in. thick. This investigation is based on data accumulated over a period of several years at A. O. Smith Corp. where it was desirable from time to time to determine the yield point and tensile stress required to crack the glass or enamel coating on various ferrous materials.

A summary of some of the results obtained are shown in the accompanying table. The two lots of titanium-bearing enameling iron analysis differ from the two lots of regular enamel iron only in the titanium content. The titanium-bearing material, however, is a fully killed steel, while the enameling iron is a rimmed steel. This table also gives the results obtained when tensile specimens were made from 0.40 carbon steel, a 1.0 C steel drill rod, and a 2.00 Ni plus 0.40 C steel. A number of these tensile specimens were given special cooling treatments after enameling (see table). These special treatments consisted of rapid cooling through part of the cooling cycle by quenching.

A special cooling quench to 875°F was developed at A. O. Smith[7] to obtain the high strength in medium and high carbon steels which can be secured by quenching and at the same time control the thermal shock so as to eliminate cracking of the enamel. By quenching at 875°F the thermal shock takes place within the plastic flow range of the glass and thus prevents damage to the glass layer.

Enamel Doesn't Crack

In comparing the results obtained from pulling these tensile bars, it is to be noted that the yield point of these steels varied from 25,700 to 92,500 psi. It is interesting to note that in spite of this wide variation in strength, the enamel did not crack until at or near the yield point of the steel. Furthermore, it was found in all of these tensile specimens—in spite of the broad range of strengths of steel covered in this investigation—that the strain in inches per inch was about the same for all specimens, and varied only from 0.002 to 0.003 in. per in.

At first glance, it would seem that it would be impossible for the glass to crack at the yield

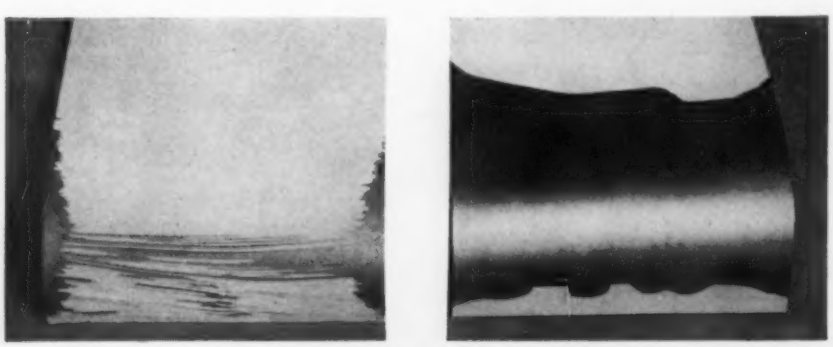


FIG. 2—Sandblasted surface, (left) and pickled surface, (right) show difference in adherence of titanium-white enamel applied directly without the usual ground coat.

point in all cases and yet for all the specimens to show about the same amount of strain before cracking. To explain this apparent anomaly, consider the diagrammatic analysis in Fig. 3.

The vertical line XY represents the strain at which cracking of the glass occurs for all steels. Consider stress-strain curve B (enameling iron). As the tensile load is applied to this specimen it follows the line E_s to about 25,000 psi. The yield point is then exceeded and of course the steel stretches considerably with very little increase in load. That is why the line B becomes horizontal at this stress. Although the specimen has yielded at 25,000 psi and at a strain of less than 0.001 in. per in., the glass does not crack at that point. It does not crack until the line B crosses XY or until a strain of 0.023 in. per in. has been reached.

In practice, it is very difficult to arrest a specimen above the yield point and before the critical strain which causes cracking has been reached. This is why enamelers have come to believe that enamel fails in tension at the yield point of the steel.

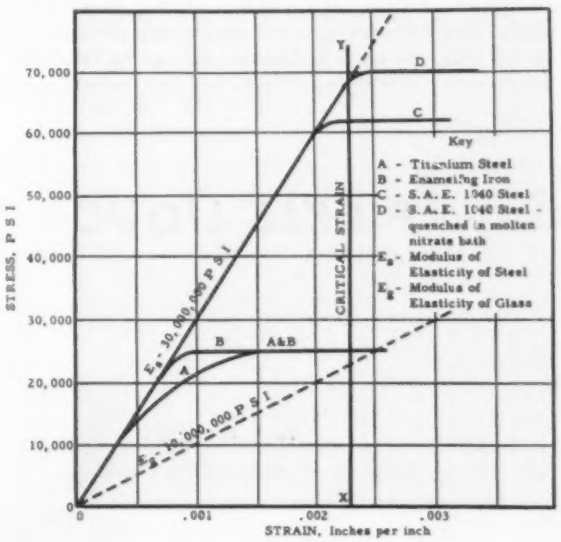
Titanium Steel Is Different

The stress-strain curve for titanium-bearing enameling iron does not follow the line E_s because this material has no definite yield point. It is similar to enameling iron, however, in respect to the strain required to cause cracking of the glass.

In a higher strength steel (curve D in Fig. 3) the steel may yield and the glass may crack simultaneously; or the critical strain may be reached and the enamel crack before the steel yields (see SAE-4640 steel in the table). This means that regardless of the strength of the steel, the porcelain enamel on it will fail at a maximum tensile stress of about 70,000 psi for steels having a yield strength value of 70,000 psi or more.

The fact that porcelain enamel will not crack or chip from the steel until the yield point of the base metal has been reached or exceeded has been useful in demonstrating the utility of porcelain enamel products. It is this property which has made Mirowal practical.[8] This thin gage enameled sheeting can be rolled up like wall-paper because the base metal is so thin the sheeting can be given a lot of deformation without taking the steel through the yield point or deforming it permanently. A cantilever beam of enameled steel was deflected time after time without damaging the glass layer. The 13-in. long beam was deflected 6 in. and released without any injury to the glass.

FIG. 3—Stress-strain curves for several enameled steels show an arresting fact: Enamel coatings all failed at strain of approximately 0.0023 in. per in.—not necessarily at steel yield points.



STRESS-STRAIN DATA FOR PORCELAIN ENAMELED SPECIMENS

Kind of Steel	Stress, psi, When Coating Cracked	In/in. Strain When Coating Cracked	Yield Point, psi	Remarks
Enameling iron No. 1	26,500	0.002?	26,300	
Enameling iron No. 2	27,100	0.0020	30,200	
Titanium bearing enameling iron	22,400	0.0025		
Titanium bearing enameling iron	22,800	0.0030		
SAE 1040	60,200	0.0025	62,000	Air Cooled
SAE 1040	63,000	0.0022	63,000	Water quenched from 600°F.
SAE 1040	70,000	0.00245	70,000	Quenched from 1600°F to 875°F.
Drill rod	70,900		75,850	Contained 1.0 C
SAE 4640	75,200	0.0025	92,500	2.00 Ni steel quenched in water from 600°F.

References

[1] *Karl Kautz, "Further Data on Enamel Adherence," Jour. Amer. Ceram. Soc., 19 (4) 93-108 (1936).*

[2] *E. E. Howe, "Observations on Adherence Phenomena of Sheet-Iron Ground Coats," Better Enameling, 9 (9) 13-19 (1938); Ceram. Abs., 19 (8) 183 (1940).*

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(b) Karl Schwartzwalder and R. M. King, "Mechanics of Enamel Adherence: VI, Petrographic, Metallographic, and X-Ray Study of Enamel-Metal Contact Zones," ibid., pp. 483-86 (1932)
(c) G. H. Spencer-Strong, J. O. Lord, and R. M. King, "Mechanics of Enamel Adherence: VII, Further Studies of Enamel-Metal Contact Zones by Microscopic and Metallographic Methods," ibid., pp. 486-90 (1932).
(d) R. M. King, "Mechanics of Enamel Adherence: X, 'Iron Oxide Layer' in Sheet-Steel Ground Coats," ibid., 17 (7) 215-19 (1934).

[4] *H. F. Staley, "Electrolytic Reactions in Vitreous Enamels and Relation to Adherence of Enamels to Steel," ibid., 17 (6) 163-67 (1934).*

[5] *W. A. Deringer, "Relation of Hydrogen to Adherence of Sheet-Steel Enamels", Amer. Cer. Soc. Vol. 26 No. 5, pp. 151-159 (1943)*

[6] *J. H. Healy & A. I. Andrews, "Cobalt Reduction Theory of Sheet Iron Enamels", Finish, pp. 22-23, Dec. (1950)*

[7] *U. S. Patent No. 1,919,136*

[8] *Dana Chase, "'Porcelain Wallpaper' Dramatizes the Versatility and Flexibility of 'Porcelain on Steel'," Finish, Vol. 5 No. 3, pp. 33-36 Mar. (1948)*

WHEATLAND TUBE CO.'s (Wheatland, Pa.) former disposal method can be seen in the foreground—a pond of spent pickle liquor. Now this waste goes into underground storage tanks, located between the plant itself, on the right, and the new processing setup, the Maneely Chemical Co., on the left. Zinc waste from the galvanizing shop is reacted with pickle liquor to produce zinc sulfate, zinc chloride and iron hydrate pigment.

PICKLE LIQUOR DISPOSAL CAN PAY OFF

By F. D. JONES
Consulting Chemist
Ardmore, Pa.

At least 600 million gal of waste pickle liquor are produced each year by the steel industry alone. In 1948 this arose from a consumption of 570,000 tons of sulfuric acid, and while up to 10 pct of it may have been dissipated in rinse water, the balance was present as ferrous sulfate and free sulfuric acid. Some of the ferrous sulfate was recovered and sold as such; some was neutralized with lime to form a gypsum-iron oxide sludge, but most of the pickle liquor was just dumped into the nearest stream or lake.

When waste is dumped into a stream, streams are overloaded beyond purifying capacity and plants, fish and other aquatic life are killed off. The water is unfit for human or industrial use without expensive treatment. The sanitary water boards of various states have served notice on most industrial plants to construct waste disposal facilities, capable of delivering clean water as effluent.

Many iron and steel plants have submitted their plans for such construction to the authorities for approval. Few have been granted any extension beyond 1951. That means that the manufacturer is the one who will pay from now on, unless he is able to convert all or part of his waste into salable materials.

The fatal defect in a lime neutralization plant is that it changes a fluid waste into another form, this time a useless semi-solid sludge. This is usually dumped into an old,

It may cost a lot of money, but disposing of the industry's 600 million gal of spent pickle liquor can provide new supplies of critically short chemicals—often at a profit. The selection of possible products and processes is wide, so that a plant can choose one well suited to its particular conditions.

abandoned lime quarry. For lime and processing alone the cost runs over 2¢ a gal of pickle liquor, and there is still the cost of transporting the sludge to its final resting place.

Turning a liability into an asset would be nothing new for the metalworking industry. At one time the western smelters did not recover arsenic but now it is an important coproduct of refining along with the metals with which it occurs in the ore. The recovery of sulfur gases from the roasting of copper, lead and zinc ores is a very important source of sulfuric acid and it did not occur spontaneously. Pressure from the neighbors and from government was required in more than one case to start these recovery systems for making sulfuric acid.

For some years the American Iron and Steel Institute has supported a research fellowship at the Mellon Institute on waste disposal and stream pollution. The annual reports of the Institute about this investigation show the obvious desirability of converting pickle liquor into useful salable materials. Dr. R. D. Hoak, head of the project, reported in 1949 that lime neutralization of pickle liquor costs about 21¢ for every hundred dollars of product value. This did not include the cost of sludge removal.

Market For Ferrous Sulfate

Several companies recover ferrous sulfate as green crystals (copperas) and sell it for farm use or to pigment makers for conversion into red or yellow oxides. The latter use competes with naturally-occurring earths. Iron sulfate is used to overcome iron deficiency in growing plants, which causes a chlorosis or yellowing of the leaf. While such green plants take in ferrous iron readily, they use ferric iron with difficulty. Unfortunately, ferrous sulfate oxidizes too easily in the open air, becoming ferric and turning brown. Ferrous sulfate has been sold so cheaply that no margin has been left for study of new uses and expansion of its market, especially in agriculture.

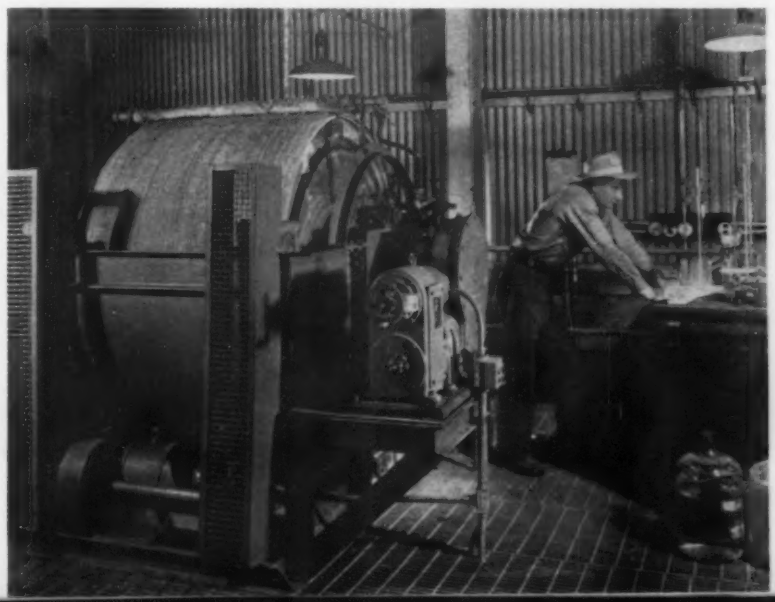
In 1948 Dr. E. D. Martin of the Inland Steel Co. showed how the surplus ferrous sulfate could be separated from waste pickle liquor by periodic evaporation and crystalizing, so that all the unused residual sulfuric acid could be reclaimed for re-use in continuous strip pickling. His process, THE IRON AGE, Sept. 30, 1948, p. 60, produces ferrous sulfate as monohydrate which contains only one-seventh as much water as the heptahydrate, the usual form of ferrous sulfate. For the same ferrous sulfate content, the monohydrate weighs only 62.5 pct as much and is therefore cheaper to handle and ship.

In 1949 the Maneely Chemical Co., an affiliate of the Wheatland Tube Co. near Sharon, Pa., built a plant for reacting the waste pickle liquor from the Wheatland pipe mill with zinc wastes from the Wheatland galvanizing shop. Zinc sulfate, zinc chloride and iron hydrate pigment are produced in this plant, parts of which are shown in the accompanying illustrations.

Tanks Can Be Dumped

When pickle liquors are freshly made up, they may contain as little as 6 pct sulfuric acid by volume (10 pct by weight). Fresh acid is added from time to time, as scale and metal use it up to form ferrous sulfate. The tank is dumped when the concentration of ferrous sulfate gets so high (25 to 27 pct) that crystals start to form. Residual sulfuric acid runs 1 to 3 pct, except in continuous strip pickling where the acid runs 5 to 7 pct and occasionally as high as 10 pct. Of course, where loads are light, tanks may be dumped to suit convenience, such as the end of a shift or work week. In such cases the liquor runs lower in ferrous sulfate and higher in acid than usual.

As steel is to our general manufacturing picture, so is sulfuric acid to our chemical industry. While steel is scarce today, the sulfuric acid shortage is worse. It is likely that many users of sulfuric acid will find they have been allotted smaller amounts in 1951 than they received in 1950. Not long ago there was a large surplus of hydrochloric (muriatic) acid production available. Now the demand outruns the supply. As a result, one maker of zinc chloride (from zinc oxide and hydrochloric acid) stopped its manufacture. The hydro-



STRING DISCHARGE rotary vacuum filter, made by Filtration Engineers, Inc., New York, removes dirty floc produced in the two preliminary reactors. Clean pickle liquor then goes to main reactor.

chloric acid was turned over to another department with a more critical need.

To get an idea of the scarcity of chemicals generally, just glance at the number of ads in the *Journal of Commerce* asking for zinc chloride, zinc sulfate, sulfuric acid and a host of others. Such ads are not seen in ordinary times.

So the operator of a plant making inorganic salts from waste pickle liquor is assured of a market in the development stage that he would not usually have. The size of the rearmament program insures a continuing demand for years to come.

These inorganic salts, along with other by-products, may be obtained by processing pickle liquor with other wastes and, sometimes, even raw materials, including ores. Brief descriptions of some possible products and processes are given below.

Sal Skimmings Now Thown Away

Much of the sal skimmings formed in galvanizing are now thrown away and the secondary zinc people buy it with reluctance. Their recovery processes do not work well on waste containing chlorides. On the other hand sal skimmings which contain 25 to 50 pct zinc, react well with pickle liquor to form high quality zinc chloride and iron oxide-gypsum pigment. Zinc chloride is used as a flux in dry batteries and in making vulcanized fibre.

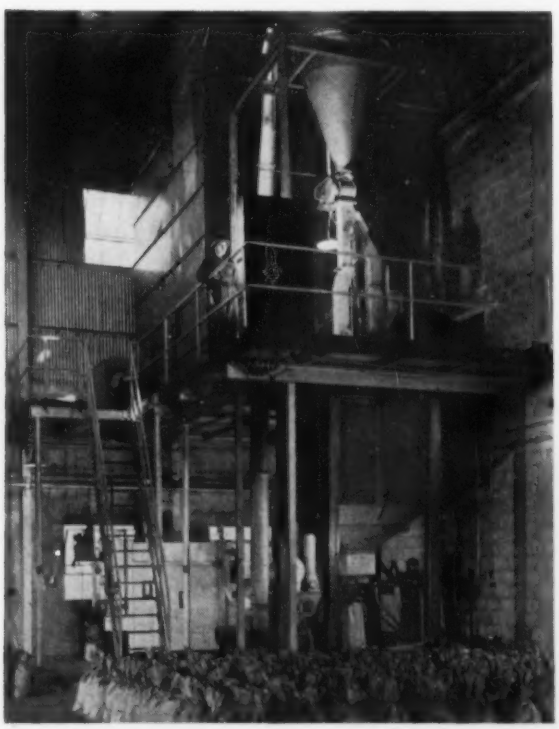
Zinc oxide ash from galvanizing reacts with pickle liquor to form zinc sulfate and iron hydrate or oxide. Zinc sulfate is used in making pigments, rayon, insecticides and fungicides. It is required in ever-increasing amounts for combatting zinc deficiency of soils in agriculture. Zinc sulfate not needed for primary use can always be refined electrolytically into metal.

Brass and Copper Scrap Used

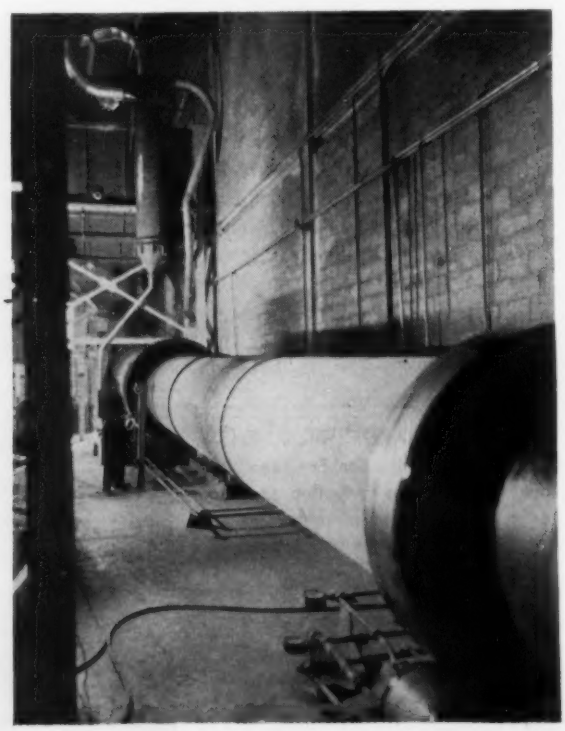
Brass and copper scrap react with pickle liquor to form copper sulfate, zinc sulfate and iron hydrate pigment. Yellow brass scrap is usually worked only for its copper values, the zinc being driven off by roasting. With this process, both metals are reclaimed as their sulfates. Agricultural demand for copper sulfate is large and growing, both for nutritional deficiency and fungicidal sprays.

Pickle liquor can be used to extract the metal from such manganese ores as pyrolusite. Manganese sulfate is concentrated and separated from the resultant solution. The solution can also be treated with aluminum shavings to form finely divided manganese or ferromanganese metal, leaving aluminum sulfate (alum) in the solution for evaporation to solid crystals.

THE LARGE BOX behind the cyclone encloses bag filters, which are protected from condensation by holding warm air around them. The bags on the floor are filled with iron hydrate from the storage bin and are ready for shipment.



AFTER ZINC WASTE has been crushed and the metallic zinc screened out, it is converted to zinc oxide in this rotary kiln, made by Kennedy-Van Saun Mfg. & Eng. Co., Danville, Pa. It is then slurried in a zinc solution for the main reactor.



Manganese sulfate is used extensively in Florida as a fertilizer supplement. Alum is needed in papermaking and water purification, and is in short supply.

Use of aluminum shavings alone precipitates powdered iron of high purity by electrochemical replacement of the iron in pickle liquor. Aluminum sulfate is left in the solution for concentration and drying. Powdered iron is used in making magnets and transformer cores. While the market is not large now, the price is good and affords a cushion to pay for research and development.

By regulating temperature and concentration, the iron can be made to precipitate as either an oxide or a hydrate, in shades from red to yellow. The hydrates are the more brilliant. Aside from pigment use, these two chemicals offer prospective sales of substantial tonnage for use in desulfurizing gas. The iron oxide is Fe_2O_3 containing 70 pct iron, so that any unsold amount can be used to beneficiate ore in sintering or pelletizing for the blast furnace.

Adding Ammonia Provides Mohr's Salt

Pickle liquor with sufficient ammonia to neutralize free acid, and the right proportion of ammonium sulfate, becomes a solution of ferrous ammonium sulfate. This is evaporated and crystallized. Ferrous ammonium sulfate, or Mohr's salt, is the most stable form of ferrous iron, as a soluble salt. Known for more than a hundred years, it is made only in small quantities for analytical use in laboratories. Why it should have been overlooked for so long is a mystery. It is a good reducing agent and when it is available in quantity a sizable market in chemical manufacturing should develop.

It has properties peculiarly suited to agriculture because of its nitrogen and iron content. Broad leaf evergreens often show a chlorosis (yellowing) of their leaves indicating a deficiency of iron and possibly nitrogen. They turn a rich green in a short time after spraying with a 1 pct solution of ferrous ammonium sulfate. The same thing happens with grass, for in most soils grass responds only to nitrogen, iron and calcium of the fertilizer elements.

Legumes, particularly in alkaline soils, show at times a puzzling chlorosis and here, too, spray application of Mohr's salt turns the leaves green again and stimulates growth. The agricultural market for ferrous ammonium sulfate looks big enough to absorb 200,000 tons a year.

Pickle liquor reacts with ground phosphate rock to form an insoluble complex that takes all the iron sulfate and sulfuric acid out of solution, leaving only clean water behind. On drying with mild heat, the complex turns brown and the phosphate radical becomes available just as it does in the conventional preparation of superphosphate from phosphate rock and sulfuric acid. The pickle liquor superphosphate is suitable for mixing in fertilizer formulas or for use by itself on soil as a source of phosphorus. With the prospects for sulfuric acid so poor, farmers will be glad to get it.

The previous products have all had the virtue of having enough margin to carry the processing and financing charges and still show a profit. Superphosphate is sold so closely that the income from this product may not meet all charges. Where this product is to be made, the process must be viewed as decreasing the cost of disposal rather than eliminating it. In any event, the end product is salable for a price.

Pickle liquor can be neutralized with soda ash to form sodium sulfate and iron hydrate. As chemicals go, the market for sodium sulfate is large, amounting to over 800,000 tons a year and used chiefly in paper and glass making. This market is cyclical and right now it is scarce like all other basic chemicals.

The zinc salt processes apply mostly to plants with 100,000 to 300,000 gal of pickle liquor a month. Ferrous ammonium sulfate is ideal for the very large plants with 1 million or more gal a month. Copper sulfate lends itself to plants with 200,000 to 500,000 a month. Manganese powder and alum would require a minimum of 100,000 gal and could be used in plants having up to 1 million gal a month. Superphosphate fertilizer could be made in plants of almost any size, being especially suited to small nuisance outputs of pickle liquor. The economics of a sodium sulfate plant would involve nearness to soda ash supply and to markets.

Cost Depends On Capacity

Most pickling of stainless steel is done with hydrofluoric and nitric acids. This mixture is so corrosive that it attacks sewer pipe and tile as well as metal. Though the composition of such waste varies from mill to mill, laboratory studies show that it is generally possible to neutralize the hydrofluoric acid, recover the valuable nitric acid for re-use, and reclaim the iron, chromium and nickel salts.

A complicating factor is the cost of installing collecting systems and storage for pickle liquor, because most plants do not have such facilities now. A plant to handle 100,000 gal a month would cost $250,000 or more, while one for 1 million gal of pickle liquor would cost about $600,000. Evaporators for a minimum of 100,000 gal a month would cost $40,000 to $50,000, while capacities costing twice as much would handle 5 to 8 times as much evaporation. Conditions vary so much from one location to another that an estimate here could be 20 pct off because of local conditions. With all but one of the chemicals mentioned maximum plant depreciation can be written off and still leave a good profit.

By A. ROBINSON (I.), *Consulting Works Technical Director*
Appleby-Frodingham Works
and J. H. CHESTERS, *Assistant Director of Research*
United Steel Cos., Ltd., *Sheffield, England*

AUTOMATIC CONTROLS increase openhearth tonnage

This summary of a recent conference held by the British Iron & Steel Research Association tells how several openhearth furnaces are safely being driven at top temperatures for a larger proportion of working time. Their roof pyrometers automatically control fuel flow, resulting in greater tonnage and some fuel savings.

Control of openhearth furnace room temperature by automatic linkage to fuel input is one of the lines of development now being pursued both in the United Kingdom and the United States. Table I shows details of nine representative furnaces discussed at a recent conference on automatic control organized by the British Iron and Steel Research Association, the industry's cooperative research organization. Furnaces operating only automatic pressure control by means of the stack damper are not included in this list. This is now a comparatively frequent arrangement and is not usually considered under the heading of "automatic." A furnace operating this system in conjunction with automatic fuel-air control is included.

The melting shop where this control system is in operation came into production at Frodingham in 1947. Two 300-ton tilting furnaces, fired by mixed coke oven and blast furnace gas, are equipped with automatic furnace pressure control and automatic gas:air ratio control. Both furnaces have also roof temperature recorders, and one has a roof temperature-fuel linkage.

At this works, careful control of draught with crude control of air and gas flow by manual methods had given excellent results since the early '30s. It was described in the Iron and

TABLE I

NINE AUTOMATICALLY CONTROLLED BRITISH FURNACES

FIRM	Appleby-Frodingham Steel Co. (Frodingham Melting Shop)	Stewarts & Lloyds, Ltd. (Bilston)	John Baker & Bessemer, Ltd.		Park Gate Iron & Steel Co., Ltd.	Samuel Fox & Co., Ltd.	John Summers & Sons, Ltd.
Number and Type of Furnaces	2—Tilting	1—Tilting	2—Fixed		1—Fixed	1—Fixed	2—Fixed
			Basic	Acid			
Capacity (tons)	300	60	60	40	95	80	75
Hearth area *(sq ft)	615	320	320	250	396	480	280
Firing	Mixed Gas	Oil	Producer Gas		Oil	Oil	Oil
Roof—silica or basic	Silica	Basic	Silica		Silica	Silica	Silica
Type of steel made	0.08-0.30 pct C Structural Section Steel	0.10-0.50 pct C killed steels	Tire wheels	and steels	0.10-0.80 pct C killed steels	All types of alloy steels	0.06 pct C Tinning Steel
Automatic Control Linkages:							
Roof temperature—fuel	"A" furnace—Yes "B" furnace—No	Yes	Yes	Yes	Yes	Yes	Yes
Air/fuel ratio	Yes	Yes	Yes	No	No	Yes	No
Steam/fuel ratio	.....	Yes	.....	.....	Yes	Yes	No
Stabilized oil flow	.....	No	.....	.....	Yes	Yes	Yes
Stabilized steam flow	.....	No	.....	.....	No	Yes	No
Stabilized air flow	No	No	No	No	No	Yes	No
Furnace pressure—stack damper	Yes	No	Yes	Yes	No	Yes	Yes

* Hearth area as defined in Symposium of Steelmaking, I. S. I., 1938, Page 387: length x breadth at foreplate level multiplied by a factor as follows:—0.85 for basic fixed furnaces, 0.91 for basic tilting furnaces.

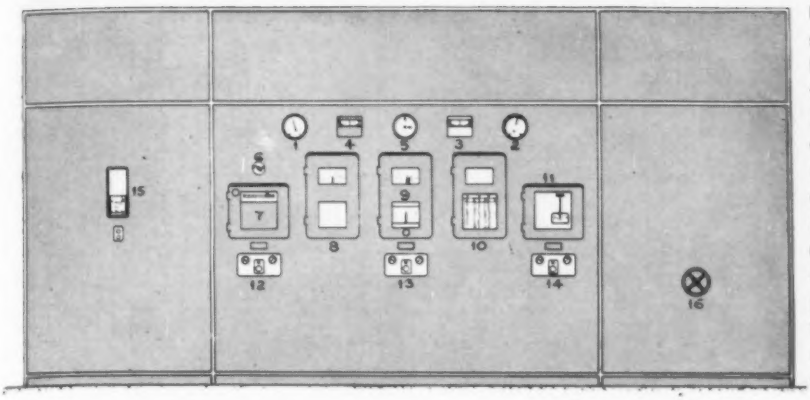


FIG. 1—Design of control panel installed at John Baker & Bessemer Ltd. Key: (1, 2) Draught indicators; (3) temperature indicator, Swinton end; (4) temperature indicator, Kilnhurst end; (5) clock; (6) temperature changeover switch; (7) temperature controller; (8) gas flow transmitter; (9) air flow controller; (10) 3-zone recorder; (11) furnace pressure controller; (12, 13, 14) relay and gauge panel for items 7, 8 and 9, respectively; (15) liquid steel temperature recorder; (16) hand-wheel for emergency fan speed control.

Steel Institute's Steelmaking Symposium of 1938. It has therefore been possible to compare the automatically controlled Frodingham furnaces with similar furnaces in another melting shop in the same works, similarly fired and instrumented, but not equipped with automatic controls.

Table II shows the results of this comparison. The figures shown as "corrected" include adjustments for: (1) delays (equated to the furnace with the least lost time), (2) charging time (equated to the more rapidly charging melting shop), (3) analysis (adjusted for greater average silicon content in charge at non-automatic shop), (4) tapping temperature. It should also be noted that 'R' furnace has streamlined flues, similar to those on 'A' and 'B', while 'Q' furnace has not.

Gain of 100 Tons Weekly

When all adjustments and this additional factor have been taken into account, it is evident that the most conservative comparison of average figures of the two shops shows an advantage of 180 tons per furnace week for automatic control. On the existing data, this 180-ton gain cannot be entirely attributed to automatic control, but it may be stated that 100 tons of this weekly gain is due to this factor. This is a very adequate return on the capital cost. The superiority of furnace 'B' over furnace 'A' points to the additional value of automatic roof temperature control. The figures of fuel consumption are equally convincing.

In 8 out out of 9 installations listed in Table I, fuel input is automatically controlled by roof temperatures. In the simplest installation, the only other linkage is between steam flow and fuel, fuel flow being capable of stabilization at any desired value. In the most complex installation, at the Samuel Fox works, seven linkages are made, Table III.

Essentially, this installation of a roof pyrometer (photocell type) linked to the oil flow, a current from the photocell being amplified by a valve and fed to the solenoid by an oil servo-controller. A rotating shaft on the final oil motor in this controller is used to operate an oil valve in the main line. Two such roof temperature-oil flow linkages are installed. Whichever pyrometer reads the higher takes control, while the valve corresponding to the other pyrometer opens to the full extent.

A stabilizer system is included so that the roof temperature link can be severed and the oil flow stabilized at any desired value. This

TABLE II

AUTOMATIC AND NON-AUTOMATIC PRODUCTION COMPARED*

	APPLEBY (non-automatic)				FRODINGHAM (automatic)			
	Q: Fully instrumented except roof temperature recorder		R: Fully instrumented including roof temperature recorder		A: Fully instrumented including roof temperature recorder and automatic gas: air ratio and furnace pressure		B: Fully instrumented and fully automatic (roof temperature control for one year only)	
	Actual	Corrected	Actual	Corrected	Actual	Corrected	Actual	Corrected
Total output (2 years)	189,036	.....	194,408	.....	219,827	.....	201,889	.....
Average per week	1,984	2,186	2,016	2,274	2,375	2,402	2,429	2,428
Operating time (pct)	89.39	.....	89.05	.....	91.49	.....	90.53	.....
No. of campaigns included	4	.....	3	.....	4	.....	4	.....
Fuel consumption (2 years):								
Therms (ton ingots)	43	.....	42.5	.....	41.2	.....	39.4	.....
Equivalent coal (cwt/ton)	3.28	.....	3.24	.....	3.14	.....	3.01	.....
Therms/hr	506.8	.....	513.2	.....	502.4	.....	501.6	.....
Equivalent coal (tons/hr)	1.94	.....	1.96	.....	2.23	.....	2.22	.....

* At Appleby-Frodingham Works of the United Steel Co.

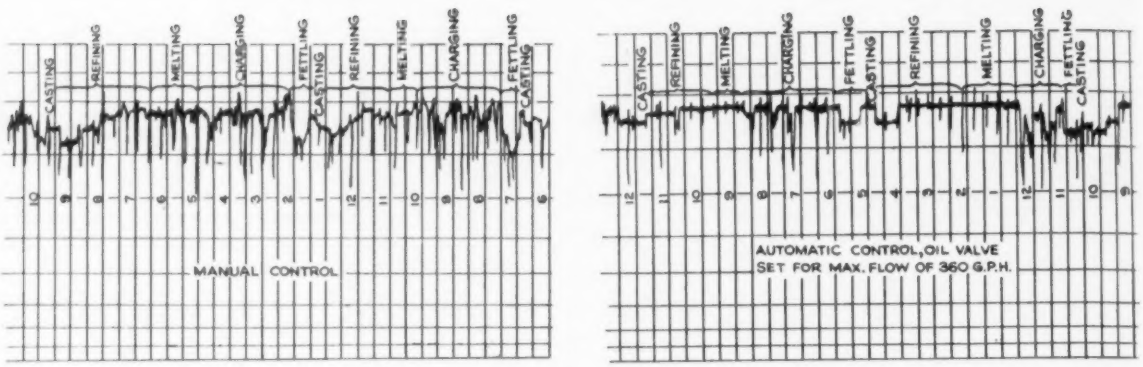


FIG. 2—Manual and automatic control record charts of roof temperature. From Bilston works of Stewarts & Lloyds Ltd.

system can also be used to act as a master control on the roof temperature link, allowing only a certain maximum oil quantity to flow regardless of the roof temperature setting. Steam flow and air flow are linked by ratio control to oil flow and are also capable of stabilization at any desired value. The pressure-draught system is operated independently.

Flexible Control System Provided

Flexibility of control over the linkage system is provided in two ways. If automatic operation must be suspended, control can be returned to manual valves previously existing on the furnace. A wide range of maximum and minimum control values can be pre-set by means of a setting switch.

All the initial signals, whether of temperature or pressure, are converted immediately to electric signals, so that all interconnections are electric and any desired amount of cross linkage can be obtained. There are six large-scale dial indicators and two 3-track recorders.

There are, of course, many degrees of complexity between these extremes, and many ways of achieving them.

The advantages claimed for automatic roof temperature control are: 1) A fixed, maximum gas or oil flow is maintained during charging until maximum roof temperature is first reached. 2) For the remainder of the charge this temperature is maintained for a larger proportion of the time. 3) During later refining stages correct steel temperature can be maintained (by resetting) to reach precisely the correct tapping temperature.

Automatic Oil-Fired Furnace Described

One example of this type of automatic control of an oil-fired furnace is at the Park Gate Iron and Steel Co. Ltd. works at Rotherham. Two fixed focus radiation pyrometers, one at each end of the roof, supply impulses to electronic recording and controlling potentiometers. The higher temperature is selected by a relay and passed on to regulate one oil flow control valve. In series with the oil control valve is a maximum limit valve, which stabilizes the maximum oil flow. The oil:steam ratio is controlled auto-

TABLE III

AUTOMATIC DETECTORS AND VALVES ON 'V' FURNACE*

Control Links	Detectors	Range of Control
Roof temperature—oil flow	To photocell pyrometers (sighted on centre of roof)	2870 to 3100° F
Maximum oil flow	Orifice and rheostat meter	100 to 450 gal per hr
Stabilized Steam flow	Orifice and rheostat meter	400 to 2000 lb per hr
Steam: oil ratio	As above (cross-coil ratioing at controller)	2 to 8 lb per gal
Stabilized air flow	Air intake orifice ring balance meter	200,000 to 850,000 cu ft per hr
Air: oil ratio	As above (cross-coil ratioing at controller)	1600 to 2500 cu ft per gal
Furnace pressure—stack damper	Differential pressure meter	0.01 to 0.11 in. w. g.

* At Samuel Fox & Co., Ltd., Stocksbridge.

TABLE IV

PRODUCTION FIGURES COMPARED*

	Total Ingots Made Tons	Oil Consumption in gal per ton steel		Pct Hot Metal in Charge	Oil Consumption in gal per ton steel (corrected to basis of 34-4 pct hot metal in charge)	
		Overall	Less Heating Up		Overall	Less Heating Up
Hand Control (3 campaigns)	94,610	33.8	33.0	29.1	30.6	29.8
Automatic Control	27,406	28.1	27.1	34.4	28.1	27.1
Difference Hand to Automatic	.....	5.7	5.9	.....	2.5	2.7

Correction of 0.6 gal of oil per 1 pct of added hot metal in charge based on statistical analysis of shop and furnace performance over three years.
* Six months automatically controlled production at Park Gate Iron & Steel Co., together with results of two previous campaigns on manual control.

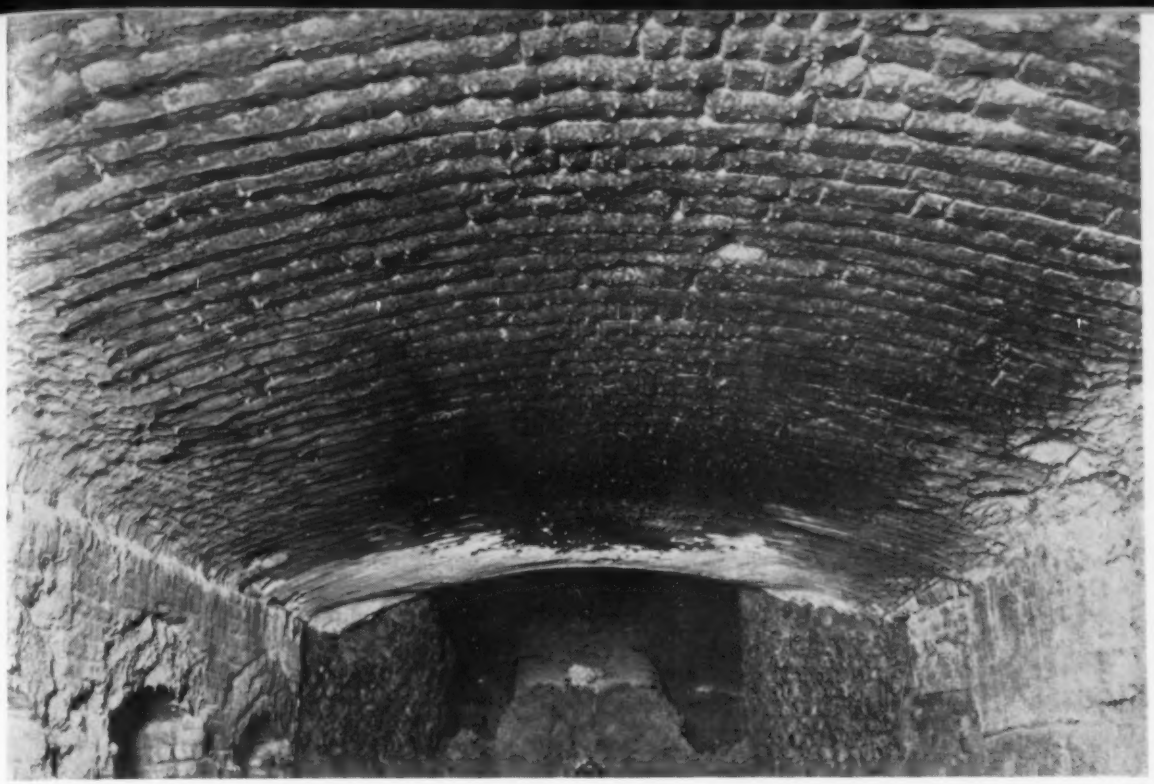


FIG. 3—Roof of furnace at Park Gate Iron & Steel Co., Ltd., as it appeared after 12 weeks on automatic control.

matically. The appropriate ratios are set manually.

Table IV shows the results achieved during six months of 1950. Some 27,406 tons of steel were made, compared with the previous three campaigns with the same furnace under hand control. The fuel saving, when allowance is made for the additional hot metal available during the later campaign, is 2½ gal per ton of steel. Similar equipment is now being installed on the remaining eight furnaces in the same shop. The benefits derived from the completed scheme are expected to be at a lower level than those obtained on the first furnace, since the most uneconomical units are being converted first.

Saving of 2.1 Gal per Ton

At the Samuel Fox and Co. Ltd. works, a somewhat similar automatic control on a cold-metal charged, oil-fired furnace, which has certain metallurgical and supply problems of its own, showed a saving of 2.1 gal per ton of steel. Output figures of these two installations are interestingly close. At Park Gate, the increase per week is 113 tons, from 1058 to 1171. At Stocksbridge it is 105 tons, from 908 to 1013. These furnaces are of a type much smaller than those normally in use in the U. S. A.

Automatic roof temperature control should also improve refractory performance, because it makes possible consistent maintenance of higher temperatures with safety. Fig. 2 illustrates this point in a comparison of automatic and manual temperature control. Record charts of an automatically controlled furnace at the Stewarts and Lloyds Ltd. works at Bilston are shown.

As this furnace is not only automatically controlled but also all-basic and of single-uptake design, its performance cannot properly be compared with any other. Still, it is sufficiently remarkable to be mentioned. During its first 24 weeks, it averaged 22.2 heats per week, with a maximum of 26. The weekly average output was 1285 tons, with a best week of 1497 tons. An average heat time was 7.56 hr tap to tap, composed of 1.03 hr fettling, 4.33 hr from start of charging to sampling and 2.2 hr refining.

Data on Refractory Wear Incomplete

Unfortunately, few installations have been established long enough for a proper assessment of the effect of automatic control on refractory wear to be made. The following comment was made on the first campaign of the Park Gate automatic furnace, referred to above:

"In the first run of thirteen weeks, the roof wore uniformly and was still in good condition. Due to the serious displacement of a springer channel it had to be taken off. After a further run of twelve weeks, the draughting conditions deteriorated and the furnace had again to be taken off for reasons not connected with the automatic control.

"For a complete build, the normal campaign is about thirty weeks, so a decision was made to carry out a full general repair since twenty-five weeks had already passed. The roof condition at this stage was again quite good, being in the region of ten inches thick from an original twelve inches. So when other circumstances permit, we have every reason to expect a roof life of seventeen weeks within any repair." Fig.

3 shows the roof at the end of the campaign.

In the United Kingdom, many openhearth furnaces are fired by producer gas. Doubt is often expressed about the possibility of applying automatic control to such furnaces. As can be seen in Table I, this has been successfully accomplished on two furnaces at the works of John Baker and Bessemer Ltd. Their melting shop manager, R. C. Baker, reported that his firm had been using automatic roof temperature control for 3½ years.

They started with a control unit of their own design. This showed them the technical difficulties which might arise and helped them to select the most suitable type of control mechanism. Mr. Baker said that at the present time there were several makes of control equipment, all of which gave perfectly satisfactory results. The one he had chosen had now been in use for 2½ years and had required very little maintenance, apart from routine care of the roof pyrometer. No special difficulty had been experienced in keeping the gas metering orifice clean or in securing satisfactory controlling impulses.

What Else Can Be Automatically Controlled?

What other variables are susceptible to automatic control? This must vary between oil-fired and gas-fired furnaces. Table I lists seven possible controls or linkages; not all of these are fundamental and none of them is used in every one of the installations included. The air-fuel ratio is an instance. It is automatically controlled on five out of the nine furnaces, but doubt of its value has been expressed even where it is in use. This is because of the infiltration of cold air that occurs, and the unknown quantities of air lost to the stack flue across the valves. Yet air-fuel control has been used in an increasingly refined form at Appleby-Frodingham since 1932. In a paper delivered at the Iron and Steel Institute in 1933 it was reported as giving "excellent results."

Furnace pressure control is another subject requiring experience and experiment, some managements putting it second in importance only to the roof temperature-oil flow link. Others say that it shows no benefit over a fixed stack draught. Automatic control seems to have reached a stage where its foundations are solidly and profitably established, but the details and direction of development are still subjects for experiment and exploration.

Some more purely mechanical problems can arise. One is that of "overshoot." During reversals when the temperature falls the oil valve opens very rapidly to recover the position. The temperature can then overshoot the control point. In fact, any condition which causes the oil valve to open very rapidly can produce this result. Although such an "overshoot" is a minor matter of, perhaps, 10 or 15°C for a short while, it nevertheless vitiates the principle of automatic roof temperature control. Various ways of overcoming the difficulty have been devised. The simplest is probably a pushbutton which switches out, for a pre-set period, the impulse from the controller to the regulator. This permits the oil flow to be maintained during reversal at the rate obtaining immediately beforehand.

Flames, Fumes, Smoke Can Cause Trouble

Other difficulties may arise from flames, fumes or smoke passing across the sight lines of radiation roof pyrometers. The first will give a falsely high and the last two a falsely low reading. Again, if a foaming slag occurs, automatic roof temperature control will protect the roof by cutting the oil supply. This may cause the foam to become worse and retard production. In all these circumstances, the skill and observation of the furnace operators must be relied on to find the remedy. Reversion to manual control for a period may be necessary.

John Baker and Bessemer Ltd., a pioneer firm in this field, attribute their high standard of performance to step-by-step introduction of instruments in close cooperation with the melters. In this way, the melters come to regard them as an aid to, and not as a substitute for, their skill. To quote the management,

> "It would be easy for a melter using automatic control to lose his independent judgment in steelmaking. But, providing he realizes that instruments of automatic control must be used in conjunction with his practical experience, he will be able to drive his furnace at the highest possible rate and still maintain a reasonable life of the furnace refractories."

What are the probable lines of future development? The value of the fundamental roof temperature-fuel flow linkage seems to have been established in practice. Next comes exploration of these and other variables to establish the optimum quantity settings for fuel and air supply under various conditions and the application of these to the furnace either by automatic or manual means.

Other methods of measuring these variables must also be investigated. For example, there is as yet no really satisfactory way of measuring O_2 in waste flue gases to measure the efficiency of combustion in the furnace.

Lastly, automatic control promises means of more precise study of the effect of second order variables, such as minor changes in burner design or the degree of superheat in the atomizing steam. At present, the effect of such variables is largely obscured by variations in major factors, such as fuel and air supply or furnace pressure.

By H. J. CHAMBERLAND
Research Engineer,
The DoAll Co., *Des Plaines, Ill.*

BAND MACHINING SAVES METAL

In many machining operations, considerable metal is wasted in chips which could be usable if removed as a solid slug. Preliminary metal removal by band machining cuts this waste. A special method of cutting blanking dies by band machining enables use of the cut-out slug as the punch, saving metal and reducing machining costs.

Everyone regrets the amount of metal wasted in chips during machining, but it seems to be a necessary evil. It is possible to reduce scrap losses due to improper machining, or rejects for other reasons, but it seldom seems possible to greatly reduce chip loss. This particularly applies to automatics, and turret and engine lathe work. But a great deal of chip waste can be prevented in work on planers, shapers, milling machines, and similar equipment. This is done through the use of band sawing to remove material in one piece which otherwise would be removed in the form of useless chips.

Band machining came into general use in the last war. However, in recent years equipment

FIG. 1—Three-section forming tool of special design band machined from 300-lb steel block. Only material wasted is approximately 42 oz of 1/16-in. saw kerf.

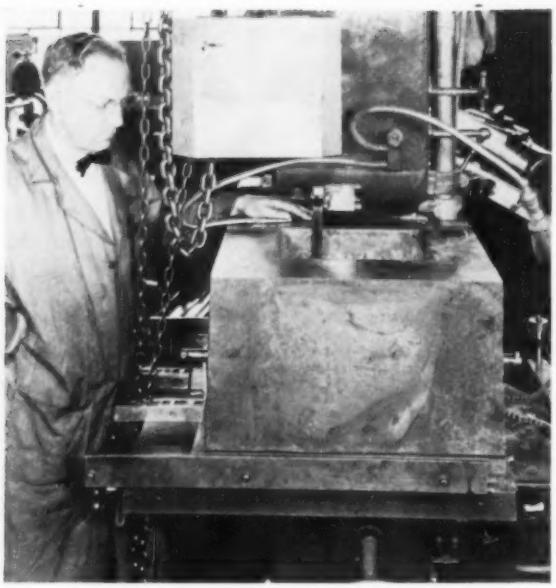


FIG. 2—Molding flask band machined with a minimum amount of material waste, in less than 1/8 of previous production time.

has been improved and technique development advanced. Although this article is intended primarily to cite modern examples of how band machining cuts material waste, it should be remembered that there are other advantages to the use of band machining.

Band sawing equipment is inexpensive to operate, easy to operate and valuable in releasing more expensive equipment for more important duty. A shaper or milling machine is not necessarily producing at maximum capacity even if operated on a 24-hr basis, because it often has to remove so much stock that feeds must be substantially reduced to avoid breakdown. Feeds could be doubled and even tripled if the operation were limited to finishing a piece previously band-machined to approximate shape.

The three parts shown in Fig. 1 are used in the production of an aircraft exhaust pipe. They are cut from a single block of special tool steel, 14x16 in. square and 5 in. thick. In band machining, the only loss is 1/16 in. of saw kerf, approximately 42 oz. The entire block weighs 300 lb. These parts were formerly machined on a shaper, from three separate blocks of steel. Considerably more than 42 oz of steel was lost in the form of chips.

Band Machining Speeds Production

Fig. 2 shows a flask for molding battery cases. The material is 13-in. carbon mold steel, and the external dimensions of the part are 21x23 in. In this case, the slug removed from the center, shown hoisted above the mold block, could have been removed in a solid piece by means other than band machining, though there would have been more waste. In this case, the saving accrues more from the speed of band-machining. The slug is sawed out in 6 hr, whereas the job formerly required 50 hr on a machine which costs three times as much to run as the band machine.

The disks shown in Fig. 3 are of 3-in. high-carbon chromium steel 12 in. in diam, and weigh 96 lb. It might at first seem that a limited advantage is gained by removing the metal in a solid slug instead of in chips, due to the small size and irregular shape of the slugs. But it is estimated that about 3 lb of each slug can be used to make another part, and this saving becomes substantial when it is realized that the weekly production of these disks is about 25. In addition, this job formerly tied up a $10,000 milling machine which is now released for other production.

One of the most interesting applications of

FIG. 3—Valuable material is saved and milling machine time freed for other purposes by removing slugs intact from these disks by band machining.

band machining is in the making of blanking dies. When machining a blanking die by conventional procedure, the slug can be removed in various ways, but that does not eliminate the fact that another piece of steel is required to make the punch. The cost of this steel is not important when dies are small, but the cost of machining them is not negligible. And the cost of the metal itself becomes of consequence when the punch is large.

There is a technique applicable to a great many blanking die designs whereby the slug removed from the die serves for the punch. It can be readily realized that such a die does not have to be large to save valuable steel. In fact, it has been computed that the savings in material vary from 40 to 55 lb on 3 in. thick material when the die opening is about 100 sq in.

In the sketch of Fig. 4, a 2-in. die block is used as an example of this method. Based on information in the accompanying table, a 13/16-in. hole has been drilled at an angle of 10°, located with respect to the layout line so that it inter-

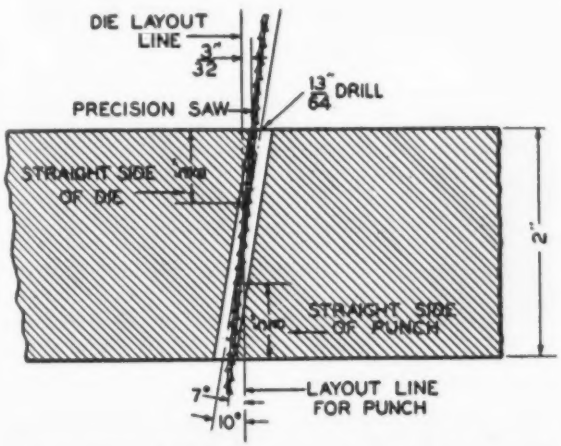


FIG. 4—Course followed by narrow precision band through die block, in relation to layout line. Purpose is to cut so that slug can be utilized as the punch.

sects this line at the center of the block, and emerges, at the bottom, on the opposite side of the layout line. Thus the path of the saw blade as the cutting proceeds is on the inside of the layout line, at the surface. And because of the predetermined angles of the hole and the machine table, the slug, which is to become the punch, has excess material outside its layout line. After completing the cut, the slug is removed and turned upside down to become the punch. To complete the dieset, only filing on the die and punch is required, as shown in Fig. 5.

This method of producing blanking dies has other advantages besides reducing materials and machining costs. Usual production time can be reduced by almost 50 pct. And, contour sawing produces minimum strains in the steel, with little or no distorting shock or heat produced.

Further, making the saw cut at an angle, as

FIG. 5—Small die being bandfiled to size, and punch in rear, were outlined with a single cut on a bandsaw.

is done in this method, automatically provides clearance to the die. And, the steel structure is greatly improved by keeping the grain of the punch and of the die parallel.

Field experience shows that at least 60 pct of plain blanking dies can be processed by the contour sawing method. This is of particular importance because of the applicability of the method to steel from ½ to 6 in. thick.

DATA FOR SETTING UP BAND MACHINING OF DIES

Die Thickness	Angle of Saw Starting Hole	Angle for Saw Cut	Distance from Die Layout Line to Center of Saw Kerf	Distance from Die Layout Line to Center of Starting Hole	Diameter of Drill	Width of Starting Saw	Amount of Straight Sides on Punch and Die
½"	21°	18°	5/64"	3/32"	1/8"	3/32"	3/16"
¾"	18°	15°	3/32"	1/8"	1/8"	3/32"	3/16"
1"	14°	11°	3/32"	1/8"	9/64"	1/8"	3/16"
1¼"	12°	9°	3/32"	1/8"	9/64"	1/8"	15/32"
1½"	11°	8°	7/64"	9/64"	9/64"	1/8"	9/16"
2"	10°	7°	1/8"	5/16"	13/64"	5/16"	13/16"
3"	9°	6°	5/32"	1/4"	17/64"	1/4"	1 1/16"
4"	8°	6°	7/32"	9/32"	17/64"	1/4"	1 5/16"
5"	7°	6°	1/4"	5/16"	17/64"	1/4"	2 1/16"
6"	6°	5°	1/4"	5/16"	17/64"	1/4"	2 1/2"

Die Thickness	Minimum Outside Radius	Minimum Inside Radius	Saw Width
½	9/32	1/8	3/32
¾	5/16	1/8	3/32
1	7/16	1/4	1/8
1¼	7/16	1/4	1/8
1½	15/32	1/4	1/8
2	11/16	7/16	5/16
3	7/8	5/16	1/4
4	1 1/32	5/16	1/4
5	1 11/16	5/16	1/4
6	1 5/8	5/16	1/4

FIG. 1—The last of a roaster body shell's four corner bends has just been formed in this machine. The vertical clamping cylinder and the horizontal one that actuates the forming roll may be seen beneath the bench.

WRAPAROUND BENCH

forms sheet metal faster

A machine made largely of angle iron puts four right-angle bends in a roaster body shell at a rate of 92 pieces an hour. Similar equipment forms the supporting cabinet's door and back panels.

By H. W. ESCHEDOR
Vice President, Production
Swartzbaugh Mfg. Co., Toledo

As large makers of electric roasters and related equipment, the Swartzbaugh Mfg. Co., Toledo, has developed efficient methods of making the components needed. A few of the setups in which fabrication is done are described here. Those chosen apply to the "wraparound," outer shell of the roaster and to a neat steel cabinet designed to support the roaster and store supplementary items commonly used with this electric appliance.

A special machine was devised for rapidly forming the four-sided, round-cornered body shells. This simple machine is illustrated in Fig. 1 and is largely air-operated. The machine makes four corner bends in a steel panel that has previously been pierced, notched, flanged and center beaded. Projections for subsequent welding are embossed at some points. Actually, the blank has a shallow, channel-like section with a return flange at each long edge and a flanged offset at one end.

As Fig. 1 indicates, the wraparound is formed in a bench-like machine made largely from angle iron. Attached to the frame are two air cylinders whose valves are operated by a pedal at the control station. The ram of the vertical cylinder operates the movable jaw of a clamp that locks the blank against the bridge supporting the form around which each bend is made.

Bending Done in Moving Frame

Actual bending is done by a roll mounted in a moving frame operated by the ram of the horizontal cylinder below the table of the machine. As this ram is advanced, it pushes a crosshead along a horizontal guide track. This crosshead is pivoted to one end of the steel frame, which is made to rock about a pivot through the center of the radius of the fixed form. The roller, supported in this frame, forms the metal in a tangent bend around the form as the frame moves the roll through a 90° arc during the advance of the crosshead. These parts are all clearly seen in Fig. 1.

A set of blanks is shown resting on the table of the machine in Fig. 1, which also shows one

FIG. 2—This supporting cabinet's corner bends are formed in a setup similar to that used for the body shell itself.

FIG. 3—A formed rear panel is in this hand-operated machine, which is also used to fabricate the cabinet door. The spring-back is eliminated when the parts making up these cabinets are assembled in the fixture used for welding.

wraparound completely formed and ready for removal from the machine. Step-by-step operation of the machine is as follows: (1) A blank is laid on a slide. (2) A long lever on the front of the machine (not visible in Fig. 1) is moved and the slide advances the blank along guides and under the bridge. This brings the blank into the precise position for the first forming. (3) The operator steps on the pedal controlling the air valves. This results, first, in the workpiece being clamped for the first bend and, second, in rocking the forming roll. The projecting end of the blank is wrapped around the form, completing the first bend.

(4) As soon as the bend is made, the operator removes his foot from the pedal. This causes the two air rams to retract and unclamps the workpiece. (5) He moves the long hand lever again, and the workpiece is advanced into position for the next bend, after which the forming cycle is repeated. (6) The two remaining bends are made in the same way. (7) The operator removes the workpiece after it is released following the fourth bend. This leaves the machine ready for reloading.

Pieces Easy to Remove

Although the bends made are all 90°, there is enough spring-back to leave the joint between the ends of the workpiece open, so that the formed piece is not difficult to remove. An experienced operator makes four bends in each of 92 pieces an hour, stacking the finished parts on pallets for transfer to the next operation. Both the form and the roll are so shaped at each end as to bend the flanges as well as the flat portions of the blank without crimping. Some wrinkles do occur near the edges of the return flanges. These are eliminated by restriking each corner in a press die. To do this the workpiece is closed and its ends overlapped at the offset where the projection welds are later made.

Somewhat similar operations are performed in making door and rear panels of the cabinet designed to support the roaster, shown completed and enameled in Fig. 2. As the rear panel and door both have U-shape sections they require only two corner bends apiece. Before these bends are made, the panels are blanked, notched and pierced and the ends that are vertical in the assembly are flanged.

Air Ram Locks Workpiece

Corner bends are made in the machine, Fig. 3, that has an air ram to lock the workpiece. The blank is clamped first along one flange and later (for the second bend) at the other flange. To load the machine, the flange is laid in a slot back of the form with the faces of the flange vertical. This makes the blank horizontal and it projects over the end of the machine toward the operator. When he presses a pedal, the flange is

locked between the edge of the table and the flat face of a half roll or form.

After locking, a flat wiper plate rests on top of the blank. This plate is pivoted so that, when a cross bar connected at each end to a rocking lever is pulled, the plate is rocked. The sheet is "wiped" and bent around the radius of the clamping half roll. This really produces a 90° tangent bend around the roll. When this bend has been made, the workpiece is unlocked and removed. The other flange is then similarly clamped and the second corner bend is made.

Fig. 3 shows a workpiece in the machine as it appears after both bends have been made and the wiper plate has been rocked back to horizontal position, preparatory to unlocking and removing the workpiece. A rear panel is shown on the floor as it appears after bending. There is some springback at the bends, of course, but this is taken out when the panel is clamped in the welding fixture, Fig. 4. The door panel has corner bends made in the same way and in the same machine but with a slightly altered setup to produce the bends near the flange. The reason for this is that the door is not as deep as the back panel.

Besides the rear panel and door, the cabinet includes a flanged top and bottom having rounded corners that fit door and back panel corner bends. Flanges on tops and bottoms are produced by drawing. Welds are made to the back panel in a fixture, Fig. 5, which also accommodates a flanged shelf. These components are positively positioned before gun welding is done. The fixture is stiff enough to avoid warpage and insures an assembly that will make a good fit with the door, which is assembled in a similar fixture. Hinges are later welded in place. The final assembly of the door produces a cabinet on which the roaster fits snugly.

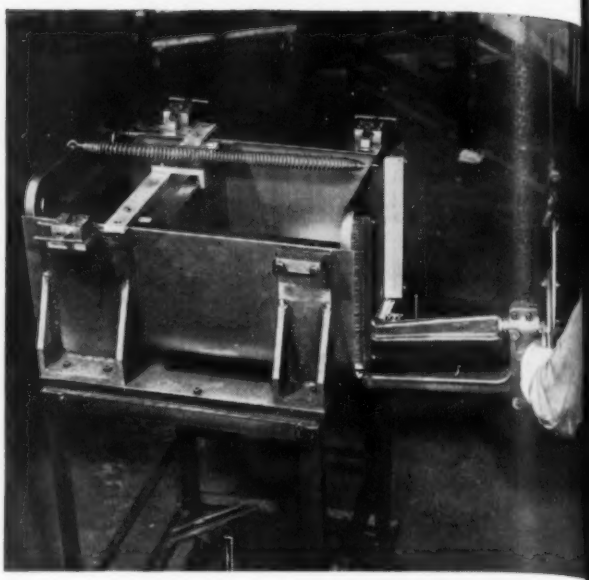


FIG. 4—The roaster's cabinet has its rear panel, top, bottom and shelf welded together in their correct relative positions in this fixture.

Washroom soap helps fight skin infections

According to R. B. Trusler, director of research for the Davies-Young Soap Co., Dayton, an effective method of reducing the incidence of skin disorders among workers is the use of an antiseptic agent in soaps used for washup. While many such agents are too strong, poisonous or evil-smelling, Mr. Trusler states that one such antiseptic soap has been developed. It contains a bacteria-killing compound known as hexachlorophene.

In a ball bearing plant, a hexachlorophene soap arrested moderately developed cases of oil comedones, folliculitis, furunculosis and other typical industrial skin troubles. A machine tool plant has reported that the preparation aided in the healing of minor cuts and scratches. Where workers must handle oils, solvents and other irritating substances, hexachlorophene should prove useful in helping to reduce or prevent secondary infections from exterior sources.

When a hexachlorophene soap is used, it deposits an invisible film on the skin, according to Mr. Trusler. The film does not wash off and only disappears during the course of normal skin regeneration, which occurs approximately every 7 days. It is the film that attacks bacteria. These bacteria are everywhere: in dust, dirt, office machines and machines.

Only a small percentage of hexachlorophene is required in a liquid soap. This is an advantage in more ways than one, since the compound is fairly expensive. Adaptation of the new preparation to washup and shower rooms is simple. Dispensers are filled with soaps containing hexachlorophene, in place of the cleansing agents presently used.

Hexachlorophene will not clear the skin of all blemishes. Many such disturbances are caused by internal disorders. Neither is the compound recommended for the treatment of open wounds.

Fairless Turns Earth for Biggest Steel Plant Job

Day of personal triumph for Benjamin Fairless at Morrisville . . . His efforts in guiding ore search in Venezuela made mill practical . . . Schedule 1952 completion—*By George Sullivan.*

Morrisville, Pa. — When Benjamin F. Fairless broke ground for a new mill near here last week he did more than start history's biggest single steel expansion project. This shovel struck a note of personal triumph, a symbol of his contribution to U. S. Steel: His was the hand that guided the worldwide search that finally uncovered in Venezuela enough iron ore to make the corporation's East Coast plant practical.

Scores of bulldozers, scoops and earth movers of Walsh Construction Co. waited as Mr. Fairless turned the first spadeful of earth for the 1.8 million-ingot ton mill which will bear his name. By the end of this year some of its mills will be working; by the end of 1952 the entire $400 million plant should be completed.

New Source for East

Here on a 3800-acre site in historic Bucks County, just across the Delaware from Trenton, N. J., U. S. Steel's eastern mill will employ 4700 workers with an annual payroll of more than $20 million. To East Coast steel users it will mean a new source of supply for sheets, tinplate, bars and pipe. Initial capacity of the works will be 289,000 tons of cold-rolled sheets, 235,000 tons of hot-rolled sheets, 285,000 tons of ⅜ to 2-in. bars and bar shapes and 170,000 tons of tin mill products. National Tube Co. will erect a pipe mill which, like the U. S. Steel Co. mill, will also be a "Fairless Works." It will have an annual capacity of 281,000 tons of butt weld pipe, with galvanizing facilities and a 30,000-ton warehouse.

For Mr. Fairless it was probably one of the happiest moments in a very successful career. After an introduction by Clifford S. Hood, executive vice-president — operations, U. S. Steel Co., he made a brief talk. He pointed up the significance of the inter-continental trade represented by American investment in Venezuela and the huge tonnage of ore that will come from that land. On the personal side he was obviously pleased at the honor being paid him. "Certainly," he said, "no man who has spent his lifetime making steel, living steel, and loving steel as I have, could want a finer monument to his career than this. . ."

DAY FOR GLORY: Benjamin F. Fairless, U. S. Steel head, glows at the honor of breaking ground for the Morrisville, Pa., mill named after him. It will mean a new source of supply for the East Coast.

Everything was perfect for the ground-breaking ceremonies on Mar. 1. Everything, that is, but the weather—and U. S. Steel had covered that with its usual foresight and three big tents. Two special trains and several special cars brought some 800 guests to the site. Most of them were U. S. Steel's eastern customers and some who might build new plants in the area to become eastern customers. Other guests included Gov. John S. Fine of Pennsylvania and Gov. Alfred E. Driscoll of New Jersey.

The Bands Played On

To entertain the guests, Mr. Hood had brought the Homestead male choir from Pittsburgh and the Gary band from Chicago. Realizing that most of the show was for the benefit of present and potential customers the sales department had filled the walls of the dining tent with descriptions of the products to be made at the new plant. For the local officials who had already seen a tremendous real estate boom there were highlights of the benefits to flow from the works. Each of the 23 tables was decorated with a miniature ingot and one wag suggested that they be raffled off for conversion by the customer guests.

Principal facilities of the new

INDUSTRIAL SHORTS

SPREADING OUT — THE CROSS CO., Detroit special machine tool builders, is adding 10,000 sq ft of floor space to its Traverse Ave. plant. Cross is also adding new equipment at its main plant on Bellevue Ave.

CHANGES NAME—Stockholders of the Electro Refractories & Alloys Corp., Buffalo, have approved a change in the corporation's name to ELECTRO REFRACTORIES & ABRASIVES CORP. The new name of the corporation is more descriptive of its operations. It no longer produces alloys.

BUSINESS IS BOOMING — FORD MOTOR CO., Detroit, will produce ammunition parts at its Highland Park division. The initial order is for approximately $7 million. Machine tools are being ordered from suppliers. Other machine tools will be obtained from Government industrial reserve.

PFEIFFER DESIGNS — David C. Pfeiffer, Dallas consulting engineer, has been named to design and supervise the construction of new power plant facilities for LONE STAR STEEL CO., East Texas works. Work on the project has already begun, which is one phase of expanded construction covered by a recent $73,500,000 loan granted the Texas firm by the government.

NEW HOME—Coalville, a town near Leicester and about 35 miles east of Birmingham, is now the new home of the British subsidiary of CATERPILLAR TRACTOR CO., Peoria, Ill. The company has leased a building from the British Government for warehouse use there.

DETROIT DISTRIBUTOR — The H. E. Dickerman Mfg. Co., Springfield, Mass., manufacturers of automatic punch press feeds, has appointed GULLBERG DIE SUPPLY CO., Detroit, as distributors of its Hitch Feeds, Die Feeds and Rol-Di-Feeds, in that area.

MAKES A MOVE — The San Francisco office of HERCULES POWDER CO. has been moved to the Standard Oil Building. The office handles sales of the company's products in the Bay area.

NEW PLANT—Construction on a completely new plant by the REED ROLLED THREAD DIE CO., Worcester, has begun. Improved plant layout, and added equipment will enable the company to handle, more efficiently its increased demand for thread rolling machines, dies, knurls and thread rolls.

THOR GETS ORDER—Chicago producer of home laundry appliances, THOR CORP. has received a large order from the Ordnance Corps of the Department of the Army for the manufacture of artillery shells. Dollar amount was not disclosed. The shells will be manufactured at the company's Bloomington, Ill., plant.

U. S. AGENT — Ferrostaal A. G., export affiliate of Gutehoffnungshuette (GHH) third largest integrated steel mill in Germany, has appointed CORTNER CORP., New York, as their agents in the U. S. A.

DEBIT PURCHASES — The Metal Craft Co., Detroit, producers of stampings, assemblies, roll forms and finished washers for automotive, household equipment and farm machinery manufacturers, has been purchased from Dexter Horton by SCOTT CARPENTER & DONALD DUNNABECK.

PORTER BUYS—The 14 supply stores of International Derrick and Equipment Co., a division of Dresser Industries, Inc., of Dallas, have been purchased by H. K. Porter Co., Inc., of Pittsburgh. The supply stores will be operated as the JARECKI INTERNATIONAL SUPPLY DIVISION of H. K. Porter Co., Inc., and will continue to sell and service the oil field products.

plant include two 87-oven Wilputte byproduct coke batteries with an annual capacity of 916,000 tons; ore, coal and limestone unloading and handling facilities with docks for ocean vessels; two blast furnaces, each with a 600,000-ton a year capacity; nine 275-ton openhearths (by Koppers) with total annual capacity of 1.8 million ingot tons; an 80-in. hot strip mill with cold mills and other finishing equipment; a bloomer; a billet mill; and a bar mill.

Subcontractors Get Ideas At Air Force Prime Contractor Show

New York — Air Force prime contractors who participated in the subcontract exhibit which closed here last week generally reported a successful show. Some 3500 would-be subcontractors visited exhibits of over a dozen prime contractors during the 2-week show. The Industrial Planning Section of the New York Air Force procurement office planned the display and invited prime contractors to display parts and assemblies for which they sought subcontractors.

Complex Assemblies Interest

Interest in the more complicated assemblies was naturally low because of the relatively few firms able to make involved parts to precision standards. But exhibitors with simpler parts reported considerable interest by companies able to take on that type of work. All accumulated files of a hundred or more potential subcontractors, with their facilities, financial ratings, etc.

Some prime contractors exhibited only because the Air Force asked them to—having nothing to subcontract at this time. But they were building their files against the day when their own shops or those of known suppliers became overcrowded.

During the first week of the exhibit some 2800 prospective subcontractors visited the show.

Pool Orders Speed Production of Machine Tools

Defense effort guaranteed 70 pct of production after July 1 . . . Initial order of $700 million expected . . . Machines can be in production months before needed . . . Orders by April.

New York — Machine tool pool orders and a 70 pct diversion of machine tool production to defense were ordered this week by the National Production Authority. While no cure-all for industry headaches, the orders will help speed vitally needed machine tools to defense production.

First pool orders are not likely to go out before April, but NPA plans to have instructions and forms in the hands of machine tool makers not later than Mar. 25.

Months of precious time are expected to be saved by the pool orders which will permit manufacturers to start machines in production schedules at once. Prime contractors who need a machine will find it already in production or in government stockpile and will not have to wait the entire time required to build the machine.

Start With $700 Million

Some $700 million will be spent for initial pool orders, with about half that amount being used as a starter. After review by NPA to make sure no one type of machine is being ordered in excess of probable needs, the balance of the program will be placed

Under the pool order system, General Services Administration, on the recommendation of NPA will place firm orders for definite types and quantities of machines. Machine tool makers with such orders can apply DO-98 to get delivery of materials and components needed for production.

Under M-41, producers will, after July 1, set aside 70 pct of their production for delivery to the armed services, or their prime or sub-contractors. Remaining production will be delivered to all other purchasers with rated and non-rated orders.

To prevent disruption of manufacturers' schedules, the order provides that no rated order received within 3 months prior to any delivery month shall affect scheduled shipments in that month. Deliveries will be parceled out among the armed services or their contractors on a percentage basis.

Calls Order "Helpful"

Comment from Tell Berna, general manager of the National Machine Tool Builders Assn., is that the orders are "helpful" but fail to solve the basic problems of obtaining necessary materials for production.

Another big headache facing the industry is finances. Many relatively small companies have gone out on the limb to boost inventories and get work in progress. Should the international picture change overnight and kill any or even all of the program, collapse of the market would follow. Under the new orders GSA would guarantee payment and is prepared to "make equitable settlement" in event of a change in plans.

Unanswered yet is the question of expanding productive capacity.

"Please, Joe, forget about your 20-year perfect attendance record and go home and take care of yourself, huh?"

Many companies need cash, but as yet no move has been made by the government to make advance payment. Government loans and certificates of necessity for faster write offs would help expansion of facilities. Wider use of sub-contracting by the industry is expected to increase production further.

Machine tools, as defined by the order, includes any machine listed in the order and selling for more than $500 for the basic machine, exclusive of motor, motor drive, or attachments except where these are built as integral parts of the machine.

Pool orders will probably not be issued in large numbers at once and first orders will probably go to builders of vertical and horizontal boring mills and planers.

Need Export License to Ship All Goods to Russia and Company

Washington — Export licenses were needed to make commercial shipments of all goods to Russia and Red bloc countries effective Mar. 2. Positive list items already require validated licenses.

Purpose of the order is not to cut off shipments but to obtain a checklist on proposed exports, said the Office of International Trade. Licenses will be refused for goods held to be contrary to national interest.

Countries affected by the regulation are: Russia, Albania, Bulgaria, Czechoslovakia, Estonia, Soviet Zone of Germany, Hungary, Latvia, Lithuania, Poland and Danzig, Rumania, and (already requiring license for all goods) China, Manchuria and North Korea.

U.S. Weighs Tin Allocations And Boycotting of World Markets

Washington—Strict domestic allocations of tin supplies and temporary withdrawal of the U. S. from world tin markets, is under government consideration.

Scrambling among government and industry buyers of tin is under critical congressional scrutiny and

some U. S. agencies want a walkout from foreign markets until prices settle down.

Sen. Lyndon Johnson, D., Tex., recommended to the Senate Armed Services Committee that the government: (1) Set up a central tin-buying agency. (2) Impose strict allocations. (3) Consider long-term buying contracts at "stable" prices. (4) Call a conference to discuss allocations of world supplies, lower prices, improved production. (5) Stop further purchases until prices become "satisfactory."

Johnson wants the government to take new steps toward more efficient use of current supplies.

In recent months, nations which have never consumed substantial quantities of tin have been importing the metal in amounts over their industrial capacity.

Cobalt and Tungsten Exports May Be Banned in Canadian Move

Toronto — Export of tungsten and cobalt from Canada may be prohibited in a move to tighten exports of essential war materials. Export permits are now required for a long list of nonferrous metals and their products.

Current Dominion cobalt production is slated for a substantial increase, and tungsten, not now being produced, is expected to be turned out at the rehabilitated Emerald Mine in British Columbia.

Among products requiring export permits are: radioactive substances, aluminum ores and products, brass and copper products, copper ores, and lead, nickel and zinc ores and products.

Trailmobile Gets Army Contract

Cincinnati, Ohio—The Trailmobile Co., here, has received a letter of intent to make more than $2 million worth of heavy duty military type truck trailers for the Corps of Engineers. Production will start in several weeks and will not interfere with civilian output.

U. S. Raw Material Frontiers Span the Globe

Withdrawal into the "fortress" grows harder . . . Some imports are vital . . . Battle for self-sufficiency may have harmful effects . . . Manganese, others on must list—*By Ted Metaxas*

New York—The world and Red Russia watches warily the "great American debate" on whether or not to contract U. S. defense lines. Some point out that the U. S. cannot easily withdraw into its "fortress" because its raw material frontiers are scattered throughout the globe.

Increasingly vast and varied production has taken the U. S. far afield from self-sufficiency and with industry stimulated by crisis and growing by the expanding yardstick of steel capacity, dependence on foreign materials will increase not lessen.

Balancing the Deficit

Steel and metals industries are in some cases almost total dependents on imports of ore and alloying elements or need imports to balance the deficit between home output and actual use. A relaxing grip on foreign sources can impair efficient, least expensive production, raise prices and send industry scuttling about for substitutes that won't always be cheaper and better. It may lead to permanent reactivation of expensive marginal mines and methods of critical materials recovery.

In a possible struggle for self-sufficiency, the U. S. must put the pressure on its own resources and shorten their life. More practical and profitable is greater exploitation and development of foreign reserves. Insecurity of resources is a bedfellow to insecurity of trade. And a favorable balance of trade has encouraged U. S. productivity, lifted the standard of living, and made money.

Even the yielding of some resources may stack more materials, men, and machines into the Russian orbit and fire that country's ambition for conquest. Russian geographical jockeying may lead to positions endangering U. S. supply lines now thought safe.

Here are some of the aces that most worried world citizens don't know they hold:

Manganese — A steelmaking must, it once came to the U. S. primarily from Russia, which pulled a checkmate and dropped the Iron Curtain on shipments. Since the U. S. still imports 90 pct of this ore, it did some trade contract reshuffling and raised imports from other producers, mainly India and Africa. Research to recover manganese from U. S. slag dumps is now being conducted.

Iron ore—Huger steel capacity of the U. S. in 1952 and beyond demands imports of ore from U. S. projects in Venezuela, Liberia, and Labrador-Quebec.

Bauxite ore—Sapped by World War II output, Arkansas reserves now produce low-grade ore which is processed with foreign bauxite. Reynolds Aluminum is developing rich Jamaican fields but the major source is Surinam. The U. S. must import twice as much ore as it has been producing. In 1944, a war year, Surinam exports to the U. S. skidded to 560,461 tons. In 1949 it shipped 2.7 million tons.

Copper—A heavy copper producer (825,000 tons in 1950), the U. S. still had to import 675,000 tons in 1950 from Chile, Rhodesia, the Belgian Congo.

Cobalt—The U. S. produced only 306 tons in 1949 and imported 2045 tons from Belgian Congo, chief producer; Northern Rhodesia, and Burma.

Chromite—Russia lets out only a trickle of former shipments and the U. S. has put greater reliance on Africa, Turkey, and Philippines. A scant 500 tons was produced here in 1949 and imports ran into the hundreds of thousands of tons. ECA funds helped

the Turkish mines buildup but more money will have to be invested or the mines will peter out. Turkey is Russia's uneasy neighbor.

Tungsten — The China Reds dropped the U. S. from their export list. Needing up to 50 pct of world output, the U. S. produced only 12 pct (based on 1948 figures).

Columbium — Product of Nigerian tin mining, columbium is an important reason why jet engine steels don't wilter. Small, poorer shipments come from Brazil and Belgian Congo.

Tin — By experimenting with tinless solders and dual-coating of cans, American firms are seeking to free themselves from heavy dependence on Malayan and Indonesian tin shipments—which have been declining while American demand climbs.

Mercury—The U. S. relies on Spanish and Italian shipments.

COAL—Awakens to Need for Research

Producers learning importance of research . . . Biggest problem is complacency within the industry . . . Several new proects may expand the present market—*By John Delaney.*

Pittsburgh—The coal industry is awakening to the importance of research. Those plugging for more research are encouraged and feel the free riders are bound to see the light, and when they do the industry will begin to roll, research-wise.

Biggest problem is complacency within the industry. Only 35 pct of the industry's commercial tonnage is contributing to the program. The handful who recognize the danger of lethargy believe participation should be closer to 80 pct.

Almost as difficult is the job of prodding the industry into applying research results to markets. Researchers are swinging into the task of interpreting research to the industry so most effective possible use of known facts will be made. Coal companies are not yet organized to do this job.

Coal Needs Outlined

Coal's needs include: (1) retention of existing markets, and reversal of the trend toward gas and oil; (2) reduction of mining costs; (3) improvement in public, customer, and dealer relations; (4) fundamental research.

Despite a skimpy budget coal's research arm, Bituminous Coal Research, Inc., has been doing a remarkable job. Some of its accomplishments were brought out at BCR's annual meeting in Columbus, O., this week. They include: Smoke prevention through overfire jets in stationary boiler plants, marine boilers, and locomotives; improved coal and ash handling for small boiler plants; basic information on pulverized coal flow and combustion; completion of a study of the economics of making fuel gas from coal, on the basis of which a cooperatively-financed project to develop improved gas producers is under way.

Development of smokeless heating stove; dustproofing, freeze-proofing and thermal drying of coal; organization of a separately-financed program for development of a continuous mining machine and related mining methods.

"That old windbag couldn't run a nursery, let alone a factor—er, Joe, meet B. J. Grahm the plant foreman!"

Research on production of new chemicals from coal; research on and promotion of commercial block heating with coal; development of the automatic coal fired steam generator (package power plant). Under another separately-financed project, BCR is working on the development of a coal-burning gas-turbine locomotive.

To Make New Studies

BCR expects to study feasibility of increasing use of electric furnaces in steelmaking. It was a BCR project that led to development of the stainless steel conveyer belt for carrying coal.

Few companies do independent research. Exceptions are Pittsburgh Consolidation Coal Co., now building a demonstration pipeline near Cadiz, O.; Sinclair Coal Co., sponsoring new methods of underground gasification of coal; Eastern Gas & Fuel Associates, working on coal carbonization and gasification.

A research project on mine drainage is being sponsored by BCR at West Virginia University. One result of this work is the discovery of a hitherto unknown organism, iron-oxidizing bacteria, which changes clear drainage to rust-colored, with elimination of additional acid. It has also found acid formation is related to sulfur minerals in roof strata and breaks in roof structure.

Million Dollar Budget

BCR operates on a budget of more than $1 million dollars a year, of which about $450,000 is for general research, and the balance for locomotive development and mining development projects. This is approximately one-twentieth of 1 pct of the value of Bituminous coal at the mines, compared with annual research expenditures by the process industries, including petroleum, of 2 pct in relation to sales.

Wilson Puts the Brakes on Granting Certificates of Nec

Washington—Government-backed steel expansion is at an end, at least for the time being, decided Defense Mobilizer C. E. Wilson. Mr. Wilson believes that contracts already placed and the production potential of the expanded steel industry will be ample to meet requirements up to 1953. He also feels that a point has been reached where the steel and other materials required make it uneconomic to consider further expansion at this time. Potential ore shortages are also behind Mr. Wilson's decision.

The decision was made known in a letter to a Virginia congressman who was seeking support for a certificate of necessity for a steel plant in Tidewater, Va. Mr. Wilson's letter indicated that approval of any additional applications would be few and far between.

The rate of granting such applications has slowed down considerably during the past month. NPA figures show that through Jan. 31, approved steel applications covered some 15.7 million ingot tons, but during February only 200,000 tons were approved. Applications

Record of All Certificates of Necessity Issued Through Jan. 30; Steel an

Applicant	Application amount [1]	Amount certified [2]	Product or service
Jones & Laughlin Steel Corp.	$60, 959, 100	$54, 241, 774	Steel ingots.
do	23, 762, 300	20, 759, 213	Steel blooms—slabs.
do	4, 625, 000	4, 222, 805	Steel—scarfing.
do	14, 921, 000	14, 771, 000	Steel bars.
do	7, 248, 700	6, 948, 700	Metallurgical coke.
do	10, 130 000	9, 930, 600	Steel rods.
do	19, 702, 000	18, 302, 000	Tin plate.
do	3, 182, 000	2, 882, 932	Iron ore unloader.
Owens-Corning Fiberglass Corp.	8, 351, 220	7, 086, 500	Fibrous glass.
Northwestern Steel & Wire Co.	4, 505, 000	4, 500 000	Small bars and shapes.
do	12, 002, 000	8, 500 000	Melting stock.
Tennessee Products & Chemical Corp.	805, 961	805, 961	Pig iron.
Radio Receptor Co. Inc.	490 000	(3)	Electronic equipment.
Donner-Hanna Coke Corp.	2, 324, 736	2, 324, 736	Coke ovens.
Great Lakes Steel Corp.	24, 833, 800	24 400 000	Pig iron.
Albion Malleable Iron Co.	1, 353, 380	1, 353, 380	Iron castings.
Youngstown Sheet & Tube Co.	20, 135, 000	20, 135, 000	Steel ingots.
do	31, 560, 000	31, 560, 000	Pig iron, coke, ingots.
do	34, 400, 000	34, 400, 000	Steel ingots.
Allied Control Co.	56, 149	56, 149	Relays and coils.
do	35, 430	35, 430	Do.
Quaker Rubber Corp.	1, 218, 553	1, 218, 553	Industrial rubber goods.
Chicago & Eastern Illinois R. R. Co.	3, 500, 000	3, 500, 000	Transportation (boxcars).
do	640, 000	640, 000	Transportation (gondola cars).
Aeroquip Corp.[4]	376, 367	376, 367	Flexible hose lines.
Lone Star Steel Co.	73, 425, 200	73, 425, 200	Steel tubing.
Connors Steel Co.	1, 286, 970	1, 286, 970	Rolling mill products.
Lehigh Valley R. R.	8, 535, 490	8, 535, 490	Transportation (box, hopper, and flat cars).
United Steel & Wire Co.	30, 060	30, 060	Barbed wire.
Marsh Steel Corp.	215, 650	55, 650	Steel warehousing.
General Refractories Co.	77, 500	77, 500	Silica—refractory brick.
do	55, 695	55, 695	Refractory brick.
do	78, 832	78, 832	Do.
do	2, 040, 530	2, 040, 530	Do.
do	1, 310, 090	1, 310, 090	Do.
do	63, 030	63, 030	Do.
do	548, 100	548, 100	Do.
Harbison-Walker Refractories Co.	1, 817, 205	1, 816, 815	Do.
do	5, 390, 775	5, 385, 298	Do.
do	1, 433, 424	1, 433, 424	Do.
do	852, 703	852, 703	Do.
Edward Swanson trading as Edson Tool & Manufacturing Co.	25, 000	25, 000	Battery boxes.
Schaefer Machine Co.	21, 385	21, 385	Bolts, shafts, fittings, etc., for aircraft.
Heintz Manufacturing Co.	210, 000	204, 000	Cartridge cases, artillery projectiles.
Owens-Corning Fiberglass Corp.	750, 000	675, 000 75, 000	Fibrous glass.
S. K. Wellman Co.	3, 678, 770	3, 650, 870	Clutch and brake parts.
West Virginia Steel & Manufacturing Co.	3, 014, 352	3, 014, 352	Semifinished steel.
The Cooper Alloy Foundry	243, 358	243, 358	Metal °centrifugal and sand castings.
Empire Steel Co.	9, 550, 000	9, 543, 500	Carbon and silicon steel.
Great Lakes Steel Co.	18, 000, 000	17, 280, 000	Coke ovens.
Houdaille-Hershey Corp.	640, 000	640, 000	Tank track link bodies.
Republic Steel Corp.	77, 950, 000	77, 662, 000	Steel ingots.
Sylvania Electric Products, Inc.	1, 075, 000	1, 065, 000	Electronics.
Arwood Precision Casting Co.	94, 100	92, 100	Castings.
Grumann Aircraft Engineering Corp.	88, 825	88, 825	Airplane parts.
The Chesapeake & Ohio Ry. Co.	9, 941, 184	9, 941, 184	Transportation (railroad-car ferries).
The Parker Appliance Co.	512, 721	503, 221	Rubber rings, gaskets, seals.
The Chesapeake & Ohio Ry. Co.	31, 587, 000	31, 587, 000	Transportation (freight cars).
Kaiser Steel Corp.	24, 595, 000	20, 160, 100	Steel ingots—tin plate.
Hazleton Steel & Tubing Co.	4, 275, 340	4, 175, 430	Steel tubing.
Micro Switch Division of Minneapolis-Honeywell.	650, 000	630, 000	Electrical appliances (precision switches).
Mechanical Products, Inc.	159, 857	159, 857	Electrical appliances.
Switlik Parachute Co., Inc.[4]	249, 048	249, 048	Parachutes, life vests, etc.
Austenal Laboratories, Inc.	292, 850	292, 850	Aircraft parts.
Roller Bearing Co. of America	1, 453, 961	1, 427, 461	Bearings.
Capital Foundry Co.	1, 452, 500	1, 377, 500	Steel castings.
The Barden Co.	622, 693	622, 693	Ball bearings.
Star Tool & Die Works	266, 000	230, 000	Aircraft fixtures.
Raybestos-Manhattan, Inc.	359, 007	359, 007	Clutch plates.
Mexico Refractories Co.	1, 409, 950	1, 409, 950	Refractory brick.

Applicant	Application amount [1]	Amount certified [2]	Product or service
Carboloy Co., Inc.	$2, 199, 215	$2, 174, 215	Tungsten carbide cores.
do	320, 000	320, 000	Tungsten carbide blanks.
Struthers Wells Corp.	17, 501	17, 501	Gun tubes.
Waldorf Instrument Corp.	59, 423	59, 423	Jet engine metering devices.
Gitz Bros.	3, 404	3, 375	Shaft seals for aircraft, tank engines.
General Refractories Co.	602, 326	602, 326	Refractory brick.
Blaw-Knox Co.	58, 000	58, 000	Steel castings.
Seren Tool & Manufacturing	2, 832	2, 832	Tank gun assemblies.
Collins Engineering Co.	95, 000	95, 000	Aircraft hardware.
Thompson Products, Inc.	4, 930, 000	4, 930, 000	Aircraft engine parts.
Air Reduction Co., Inc.	562, 125	562, 125	Liquid oxygen.
Minneapolis-Honeywell Regulator Co	2, 316, 618	2, 316, 618	Electronic controls (aircraft).
Crucible Steel Co. of America	1, 127, 749	1, 127, 749	Coal.
do	3, 166, 320	3, 166, 320	Coke.
do	22, 957, 824	22, 957, 824	Steel ingots—pig iron.
Woodward Iron Co.	4, 500, 000	4, 500, 000	Pig iron.
The Dow Chemical Co.	17, 180, 000	17, 124, 750	Magnesium sheet.
do	4, 150, 000	4, 150, 000	Magnesiums extrusions.
do	3, 237, 000	3, 237, 000	Magnesium alloy, sheets and extrusions.
do	1, 065, 000	1, 065, 000	Do.
do	791, 600	791, 600	Magnesium alloy and extrusions.
do	578, 400	578, 400	Magnesium sheet.
do	194, 000	194, 000	Magnesium sheet, extrusions and alloy.
do	350, 000	350, 000	Do.
White Fuel Corp.	800, 000	800, 000	Storage (petroleum products).
The Dolite Co.	100, 000	100, 000	Roasted refractory dolomite.
do	35, 417	35, 417	Roasted refractory brick.
Union Oil Co. of California	135, 000	135, 000	Aviation gas.
Ohio River Co.	1, 458, 622	1, 458, 622	Transportation (steel barges).
do	400, 000	400, 000	Transportation (tow boat).
Brooks & Perkins Inc.	573, 500	536, 000	Magnesium alloy, sheets and plate.
Alabama By-Products Corp.	2, 418, 636	2, 418, 636	Metallurgical coke, benzene, tar.
American Lava Corp.	712, 140	712, 140	Ceramic cores.
Tube Processing Inc.	12, 425	12, 425	Fuel and oil lines (aircraft).
Keystone Steel & Wire	1, 500, 000	1, 500, 000	Steel ingots.
Northwest Magnesite Co.[4]	5, 811, 091	5, 786, 979	Dead burned magnesite.
Harbison-Walker Refractories Co.	925, 231	925, 231	Calcined clay.
do	1, 621, 345	1, 621, 345	Refractory brick.
do	1, 024, 999	1, 024, 999	Silica, refractory brick.
Experiment, Inc.	28, 000	28, 000	Research (guided missiles and jet engines).
McPhillips & Co., Inc.	34, 180	34, 180	Pack, field and parachute.
General Refractories Co.	3, 677, 550	3, 677, 550	Refractory brick.
Warren Webster & Co.	250, 000	250, 000	Booster metal parts (ordnance).
The New York Air Brake Co.	748, 870	748, 870	Hydraulic pumps (aircraft).
Green River Steel Co.	8, 001, 032	8, 001, 032	Carbon steels.
Island Machine Co., Inc.	45, 928	45, 928	Precision machined aircraft assemblies and parts.
Dresser Industries, Inc.	663, 070	636, 845	Steel rings (jet engines).
Cook Electric Co.	276, 094	267, 043	Relay, assembly, fuel, control switch aircraft.
The Aircraft Fittings Co.	124, 506	124, 506	Tube fittings, hose coupings, aircraft.
Lehigh & New England Railroad Co.	2, 275, 000	2, 275, 000	Transportation (rail).
Harvey Machine Co., Inc.[4]	400, 000	400, 000	Rocket fuses and shells.
General Laboratory Associates Inc.	83, 100	81, 100	Ignition equipment, aircraft.
Republic Steel Corp.	6, 000, 000	6, 000, 000	Coke.
do	500, 000	500, 000	Pig iron.
do	1, 750, 000	1, 750, 000	Steel ingots.
do	705, 000	705, 000	Do.
do	7, 000, 000	7, 000, 000	Coke.
Surplus & Salvage Co., Inc.	30, 000	30, 000	Scrap (iron).
Gould-National Batteries, Inc.	1, 056, 500	1, 051, 500	Ordnance and aircraft batteries.
Raytheon Manufacturing Co.	2, 007, 720	2, 007, 720	Magnetron tubes.
Armco Steel Co.	12, 243, 981	12, 243, 981	Steel ingots and plates.
do	59, 275, 000	59, 275, 000	Coke, pig iron, steel products.
Sheffield Steel Corp.	10, 500, 000	10, 500, 000	Steel ingots.
Minneapolis-Honeywell Regulator Co.	3, 788, 000	3, 788, 000	Auto-pilots, fuel gages, gyros (aircraft).
The M. W. Kellogg Co.	154, 084	127, 733	Liquid rocket engines.
The Dolite Co.	35, 000	35, 000	Roasted refractory dolomite.
do	166, 700	166, 700	Do.
do	426, 993	426, 993	Do.
do	73, 294	73, 294	Do.

f Necessity for Expansion of Steel Industry

covering some 8 million tons are still pending and are likely to remain so.

Mr. Wilson may also have wished to stop some politicians from making fast tax writeoff a publicity grab-bag.

Meanwhile, Mr. Wilson has revealed to Sen. O'Mahoney, D., Wyo., chairman of the Joint Economic Committee, that total applications for certificates of necessity have passed the $6 billion mark. About $1.8 billion in plant expansion has been approved.

A committee tabulation shows that of the total approved, 80 pct of the applications were approved on a 100 pct basis, while the remaining 20 pct approval was about 93 pct of the amount for which application was made—much higher than had been supposed.

The committee report further shows that of the $1.8 billion certified, $1,429,000,000 is for steel expansion, and $250 million for the proposed New England mill. The applications for steel expansion amount to $1,483,000,000, indicating that amortization for steel facilities was granted on the basis of 96.3 pct of application.

teel and Metalworking Industries Get Lion's Share

Applicant	Application amount [1]	Amount certified [2]	Product or service
McLouth Steel Corp	$2,294,442	$2,294,442	Steel ingots, hot rolled steel.
The Massey-Harris Co	1,806,196	1,779,096	Carriage, howitzer.
Heimann Industries, Inc	241,800	223,800	Carbon steel (strip).
Sharon Tube Co	2,333,532	2,313,532	Pipe.
The Apex Tool Co	139,754	135,754	Aircraft engines, parts and accessories.
Casting Engineers, Inc.[4]	125,692	100,692	Precision invest castings.
Merrill Bros	141,934	141,934	Impression die forgings (metals).
The M. B. Manufacturing Co., Inc	108,240	108,240	Aircraft engine mounts and fittings.
The Deutsch Co	54,333	54,333	Hydraulic fittings, aircraft, rocket fins.
Aircraft Products Co	12,354	12,354	Machine metal parts for aircraft.
Armco Steel Co	32,000,000	32,000,000	Hot rolled steel.
do	1,426,725	1,426,725	Hot rolled electrical steel sheets.
do	49,046,700	49,046,700	Coke, pig iron, steel ingots.
National Steel Co	4,210,000	4,210,000	Coke.
do	2,868,425	2,868,425	Steel ingots.
Detroit Steel Corp	52,342,848	47,797,100	Carbon, sheet steel.
Extruded Hinge Co	21,500	21,500	Aircraft hinges and connectors.
The Glenn L. Martin Co	76,496	76,496	Aircraft, guided missiles, special weapons.
Howard Foundry Co	1,222,175	1,222,175	Combustion cases, jet engine (aircraft).
California Bag & Metal Co	41,390	41,390	Scrap iron (processing).
Wheeling Steel Corp	8,750,000	8,750,000	Coke.
Chrysler Corp	15,973,900	15,973,900	Military tanks.
Downside Machine Shop	31,035	31,035	Machining steel parts for airplanes.
do	12,584	12,584	Do.
Whitney Blake Co	451,951	451,951	Field wire (Signal Corps).
J. P. Seeburg	127,230	127,230	Radio and radar apparatus.
The Deutsch Co	354,179	354,179	Hydraulic fittings (aircraft).
Miller Printing Machinery Co	125,000	125,000	Mounts for 90 millimeter gun.
Republic Aviation Corp	5,348,047	5,166,139	Aircraft.
Spencer Wire Co	1,215,685	1,215,685	Copper wire; steel wire.
Blaw-Knox Division of Blaw-Knox	50,900	50,900	Radio, radar towers.
Detroit Kellering Co	103,970	103,970	Machining of engine mount.
Capital City Machine	13,710	13,710	Tools, gages (aircraft).
Allegheny Ludlum Steel Co	5,266,000	5,266,000	Alloy steel sheets.
Machlett Laboratories, Inc	555,000	555,000	Electronic tubes.
Jones & Laughlin Ore Co	3,500,000	3,298,035	Iron ore.
do	2,951,425	2,951,425	Sintered iron ore.
do	9,093,700	8,943,700	Iron ore.
do	2,000,000	1,962,000	Steel tube rounds.
A. O. Smith	7,605,990	7,590,833	Pipe, gas transmission.
Progress Manufacturing Co., Inc	14,214	14,214	Spot welding (electronic equipment).
Washburn Wire Co	638,000	638,000	Steel ingots.
Aero Trades Manufacturing Co	37,000	30,000	Aircraft parts assembly.
Silent Glow Oil Burner Corp	30,040	30,040	Mine case, mine crate.
Filtrol Corp	725,406	725,406	Palleted catalyst (for use in gasoline and rubber production).
do	1,979,703	1,979,703	S. R. catalyst.
Special Steels Co	227,751	227,751	Scrap iron and steel.
AVCO Manufacturing Co	23,468	23,468	Tappet guides (aircraft).
National Water Lift Co	47,803	47,803	Housing assembly (aircraft).
Acme Industrial Co	45,942	45,942	Hydraulic parts (aircraft).
South-Bend Screw Products Inc	75,551	75,551	Aircraft engine parts.
The Wel-Met Co	412,534	412,534	Bearings and parts (aircraft ordnance).
Lehigh Valley Railroad Co	1,377,782	1,377,782	Transportation (rail).
Harbison-Walker Refractories Co	1,659,659	1,659,659	Refractories.
do	5,309,131	5,309,131	Silica refractories.
McDonnell Aircraft Corp	1,115,922	1,115,922	Aircraft parts.
The Thomas Steel Co	1,742,417	1,142,417	Cold-rolled steel.
Cahlair Products Co	64,935	64,935	Airframe machined parts.
Tung-Sol Lamp Works, Inc	60,600	60,600	Electron tube.
McLouth Steel Corp	24,055,906	22,891,877	Steel ingots.
Marcus Mason & Co., Inc	83,071	83,071	Couplings (aircraft).
Boeing Airplane Co	343,107	281,014	Aircraft.
Seaboard Air Line Railroad Co	5,997,534	5,997,534	Transportation (rail).
do	10,114,480	10,114,480	Do.
Hutchinson Pipe and Waste Material	23,450	23,450	Steel scrap.
Commercial Metals Co	136,892	136,892	Scrap iron.
Ohio Ferro-Alloys Corp	$1,400,000	$1,400,000	Ferromanganese, Silicomanganese.
Pittsburgh Steel Co	2,120,000	2,120,000	Pig iron.
do	8,757,000	8,757,000	Steel ingots.
do	7,254,000	7,254,000	Shell steel, forging billets.
do	38,097,000	38,047,000	Steel plates and sheets.
Steel Briquette Corp	35,000	35,000	Steel scrap (tin can briquettes).
Lavelle Aircraft Corp	133,574	135,574	Engine mounts for airplanes.
Aero Supply Manufactur ing Co	118,000	118,000	Aircraft hardware and parts.
A. P. Green Fire Brick Co	407,265	407,265	Refractories (fire brick).
do	294,229	294,229	Do.
National Steel Corp. (Weirton)	982,000	982,000	Tin, steel scrap.
do	1,352,000	1,352,000	Pig iron.
The Interlake Steamship Co	6,000,000	6,000,000	Transportation (lake ore-ship).
Sundstrand Machine Tool Corp	550,605	550,605	Alternator drive (aircraft).
do	2,827,175	2,827,175	Do.
Raytheon Manufacturing Co	800,000	730,000	Tubes (electronic).
Hansen-Lynn	2,200	2,200	Aircraft controls.
Walsh Refractories Corp	335,850	335,850	Refractories (brick).
Big Savage Refractories Corp	581,762	581,762	Do.
Aircraft Engineering Products	52,464	52,464	Aircraft hydraulic cylinders.
Axelson Manufacturing Co	1,125,000	655,000	Aircraft gears.
Tennessee Coal, Iron & Railroad Co	41,525,000	41,525,000	Iron Ores, steel.
Geneva Steel Co	4,263,000	4,263,000	Steel ingots.
Carnegie-Illinois Steel Corp	351,414,000	326,255,000	Pig iron, steel ingots, coke and coal chemicals.
National Tube Co	46,631,420	46,631,420	Buttweld pipe.
Pittsburgh Steamship Co	16,500,000	16,500,000	Transportation (lake ore ship).
Bradley Transportation Co	6,490,000	6,490,000	Transportation (lake freighter).
The Columbia Transportation Co	12,000,000	12,000,000	Transportation (lake ore ship).
United Aircraft Corp. (Pratt & Whitney).	19,847,085	19,847,085	Aircraft engines and parts.
United Aircraft Corp. (Sikorsky division).	2,691,105	2,691,105	Helicopters and parts.
United Aircraft Corp. (Hamilton Standard).	2,369,460	2,369,460	Aircraft propellers and equipment.
Lewyt Corp	3,194,783	2,894,783	Communication equipment.
North American Refractories Co	281,024	281,024	Silica brick.
National Steel Corp. (Weirton division).	1,172,000	1,172,000	Pig iron.
Great Lakes Steel Corp.[4]	650,600	650,600	Steel products.
do	2,062,700	2,062,700	Coke.
New England Steel Development Corp.	250,000,000	250,000,000	Steel.
Weatherhead Co	827,610	816,410	Aircraft hose assemblies.
Jackson-Hope Towing Co., Inc	94,360	94,360	Transportation (barge).
The Ironton Fire Brick Co	170,000	170,000	Firebrick and plastic refractories.
Keystone Steel and Wire Co	295,000	295,000	Steel wire.
Rotary Electric Steel Co	1,605,000	1,605,000	Steel bars.
Goodyear Corp	216,694	216,694	Fuel tanks.
Rotary Electric Steel Co	450,000	450,000	Steel ingots.
Republic Steel Corp	396,000	396,000	Do.
Bethlehem Steel Co	19,034,000	18,884,000	Pig iron, steel ingots.
Oregon Steel Mills	245,865	245,865	Steel ingots and bars.
Bethlehem Steel Co	1,642,000	1,642,000	Steel ingots, rails.
do	38,401,000	38,401,000	Coke, pig iron, steel ingots.
do	2,906,000	2,231,000	Pig iron, steel ingots.
Bethlehem Pacific Coast Steel Corp	3,348,000	2,932,000	Steel ingots, nuts and bolts.
do	362,000	362,000	Steel ingots, bolts.
Bethlehem Steel Co	56,000,000	56,000,000	Coke, pig iron, steel ingots.
do	2,831,000	2,831,000	Steel ingots and slabs.
do	19,613,000	19,613,000	Coke, pig iron, steel ingots.
Bethlehem Pacific Coast Steel Corp	2,123,000	2,123,000	Steel ingots.
Nicholson University Steamship	9,930,000	9,930,000	Transportation (Lakes freighters).
Laclede Steel Co	492,233	492,233	Steel ingots.
National Steel Corp. (Weirton division).	3,319,000	3,319,000	Pig iron, steel ingots.
Jones & Laughlin Steel Corp	8,955,300	8,955,300	Pig iron.
do	9,259,000	9,259,000	Steel ingots.
do	9,144,850	9,144,850	Steel plates, sheets and strips.
do	1,485,000	1,485,000	Steel ingots and slabs.

[1] Cost of facilities estimated by applicant.
[2] Amount of preceding column eligible for percentage certification.
[3] No dollar amount certified at time certificate was issued.
[4] Application revised, returned to delegate agency.

Source: Business Expansion Office (Byron D. Woodside, Director).

CONTROLS DIGEST

Expect Tighter Controls On Zinc After Washington Conference

Washington — Tighter controls over zinc inventories and consumption loomed this week following a meeting of National Production Authority officials with members of its industry advisory committee.

End-use restrictions on other metals, by reducing demand for die castings and some brass mill products, has freed some high grade zinc for mixing with other metals to make lower grades. But the overall supply, particularly prime western grade zinc, is still tight.

The control agency is considering further reduction in the presently permitted 80 pct of the base period rate.

Cole Heads NPA Steel Division

Washington—Melvin W. Cole, on leave of absence from Bethlehem Steel Co., has been named director of NPA's iron and steel division.

He succeeds David B. Carson, who returns as vice-president in charge of sales for Sharon Steel Corp. Under a rotating plan whereby business executives serve in essential posts for indefinite periods, Mr. Carson has headed the NPA division since last October.

Mr. Cole has been serving as the division's deputy director since last January. He had previously served during wartime with the WPB steel division, and again as acting chief of the steel division of the Office of Industry Cooperation in 1948.

Industry Controls This Week:

NPA Orders

M-1, Steel plate amendment—Steel producers must accept DO's for 20 pct of carbon and alloy plate output. Effective May 1.

M-12, Copper amendment—Cut off date for making copper fins in heating and ventilating equipment extended to Apr. 1. Effective Feb. 27.

M-14, Nickel amendment—Permits manufacturers to use up inventories of nickel, stainless steel, or high nickel alloys in making articles previously restricted. Some new forms of nickel placed under control. Effective Feb. 28.

M-32, Amendment—Barium carbonate added to list of items for which 20 pct of production is to be set aside for DO's.

M-40, Machine tool pool orders—Sets up a system of pool orders by which General Services Administration will give machine tool makers firm orders for machines. Effective Feb. 28.

M-41, Machine tools deliveries—Guarantee defense plants 70 pct of machine tool production after July 1.

M-42, Insect wire—Ceiling for acceptance of DO's for screening wire set at 10 pct of monthly production. Effective Mar. 2.

M-43, Construction machinery—Ceilings for rated orders set at 50 pct of average production for first 6-months of 1950.

Included are: Bituminous equipment, compressors, crushers and conveyors, concrete equipment, cranes-shovels-excavators, drills, leaders, graders, rollers and scrapers, pumps, tractors and allied items, and trucks and trailers including truck concrete mixers.

NPA Clamps Tight Control On Power Equipment Manufacturers

Washington — In the tightest control order yet, the National Production Authority this week issued M-44, covering manufacture of heavy power equipment.

NPA may cancel or return booked orders, change production schedules, allocate orders placed with one producer to another, and take any action deemed necessary with respect to orders for equipment or parts.

Producers must report to NPA by the 15th of each month (form NPAF-31) the orders on hand and production and delivery schedules. First report must be filed by Mar. 15.

Priority assistance will be given in obtaining steel, copper and aluminum if such is needed to meet NPA approved schedules.

Products covered are: Steam and hydraulic turbines, internal combustion engines, steam, hydraulic turbine or engine driven generator sets, electric generators, steam boilers and steam condensers, coal pulverizers, oil and air circuit breakers, power and metal clad switchgear, and transformers.

Defense Contracts to Metalworking Industry

Selected Contracts, Week of Mar. 5, 1951

Item	Quan.	Value	Company
Aircraft Energizers	200	520,000	General Electric Co., Washington, D. C.
Hydraulic presses	...	10,932,052	Loewy Construction Co., Inc., New York
Engine Analyzers	...	618,000	Sperry Gyroscope Corp., Great Neck, L.I.
Gyro Indicators	...	1,250,000	Minneapolis - Honeywell Regulator Co., Minneapolis
Rocket Sight	...	1,000,000	Sorensen & Co., Inc., Stamford, Conn.
Trainer-Radar	...	3,905,000	Transducer Corp., Boston
Starters	...	635,905	Jack & Heintz Industries, Cleveland
Modification, gyro	...	1,448,195	Schwien Engineering Co., Los Angeles
Misc. assemblies	...	2,000,000	North American Aviation Inc., Los Angeles
Target aircraft	...	15,280,000	Radioplane Co., Van Nuys, Calif.
Spare parts	...	4,813,083	North American Aviation Inc., Los Angeles
Heaters	...	1,316,778	Surface Combustion Corp., Toledo
Aircraft coolers	...	759,924	Keco Industries, Inc., Cincinnati
Engine	1,500	15,000,000	Ford Motor Co., Dearborn, Mich.
Trucks, lift	100	385,000	Towmotor Corp., Cleveland
Diesel engines	...	7,189,729	General Motors Corp., Cleveland
Modulator	40,000	572,400	Johnson Service Co., Milwaukee
Repeator telephone	428	523,000	Western Electric Co., New York
Telegraph terminal	966	1,400,000	Federal Tel. & Radio Corp., Clifton, N. J.
Teletype set	1,646	1,900,020	Kleinscheidt Lab., Inc., Deerfield, Ill.
Trucks	199	982,311	Federal Motor Truck Co., Detroit
Snow plows	35	838,880	Klauer Mfg. Co., Dubuque, Iowa
Diesel engine parts	477,298	929,513	American Bosch Corp., Springfield, Mass.
Trucks	...	24,250,179	Ford Motor Co., Washington, D. C.
Bus	...	5,750,265	ACF Brill Motors Co., Philadelphia
Bus	...	11,554,200	GMC Truck & Coach Div., Pontiac, Mich.
Station wagon	...	845,695	Chevrolet Motor Div., G. M. Corp., Detroit
Truck	15,868	33,500,000	Chrysler Corp., Detroit
Compressor, air	3,384	980,514	W. H. Anderson Co., Inc., Detroit
Truck	4,500	12,380,000	The Studebaker Corp., South Bend, Ind.

Iron Ore Mystery Looms In Central California

Claims by backers of new Yolo Steel & Metal Co. unsupported by Federal, State, mining experts . . . Projected $264 million mill rests on claim to ore deposit. *By Robert T. Reinhardt.*

San Francisco—Apparently the U. S. Bureau of Mines, California State Div. of Mines, and raw materials experts of the West's leading steel producers had better resort to a ouija board.

Although the state of California as well as the rest of the West has been combed with a fine tooth comb in the search for iron ore to supply the blast furnaces of Geneva Steel Co. in Utah, and Kaiser Steel Corp. at Fontana, Calif., it is now claimed that somewhere in central California lies approximately 200 million tons of rich ore.

That is the claim made by promoters of the Yolo Steel & Metal Co., incorporated recently in California and headed by G. I. Dumond, Sacramento mining engineer and war time operator of a plant producing steel barges and ship parts in Sacramento.

Yet to Be Found

It is that alleged tonnage of ore which is to constitute the basis for a $264 million iron and steel plant in Sacramento County. The promoters also assert, but with less positiveness, that it has options on coal deposits variously described as being in Utah, Washington and California.

So far as can be learned no coal of coking quality in quantity is to be found on the West Coast. Kaiser at Fontana hauls the bulk of his coal from Utah and brings in a small percentage from as far as Oklahoma.

The sponsoring group states it is convinced the market for steel in the West will justify their proposed plant and reports this market as being approximately 8 million tons yearly. Most competent western market analysts place steel consumption in all seven western states at approximately four and a half to five million tons.

Backers of the project have stated for publication they are not interested in public financing and it is known that individuals have been invited to invest in the project. The promoters do not anticipate need of government financing although an application for a certificate of necessity for $24 million has been filed which would allow early amortization only and is no assurance of financing. A companion company, Yolo Steel and Coal Mining Co., has been incorporated as an affiliate to handle raw material supply.

Yolo Planners

Articles of incorporation for the Yolo Steel & Metal Co. carry the names of John W. Coulman, John S. Sinai and David P. Peter, all of Reno, Nev.; and Beverly Silardi of Sparks, Neb. Mine company articles of incorporation include the names of Dr. Frank O'Neill of Oroville, Calif.; Fontaine Johnson, Sacramento, Calif.; Beverly Silardi; and Norma M. Anderson of Reno, Nev.

Several of these persons have been associated with Mr. Dumond in mining ventures and others are attorneys. Names of financial backers have not been reported.

Since this project was first intimated in THE IRON AGE (Jan. 25, p. 49) and named in the issue of Feb. 22, p. 63, it has been the subject of considerable editorial enthusiasm. Some Western writers, however, have treated the subject more cautiously.

Possible Developments?

Next development in this project will be some announcement from Washington on the granting or rejection of the certificate of necessity or possibly publication of authenticated reports on the ore and coal deposits.

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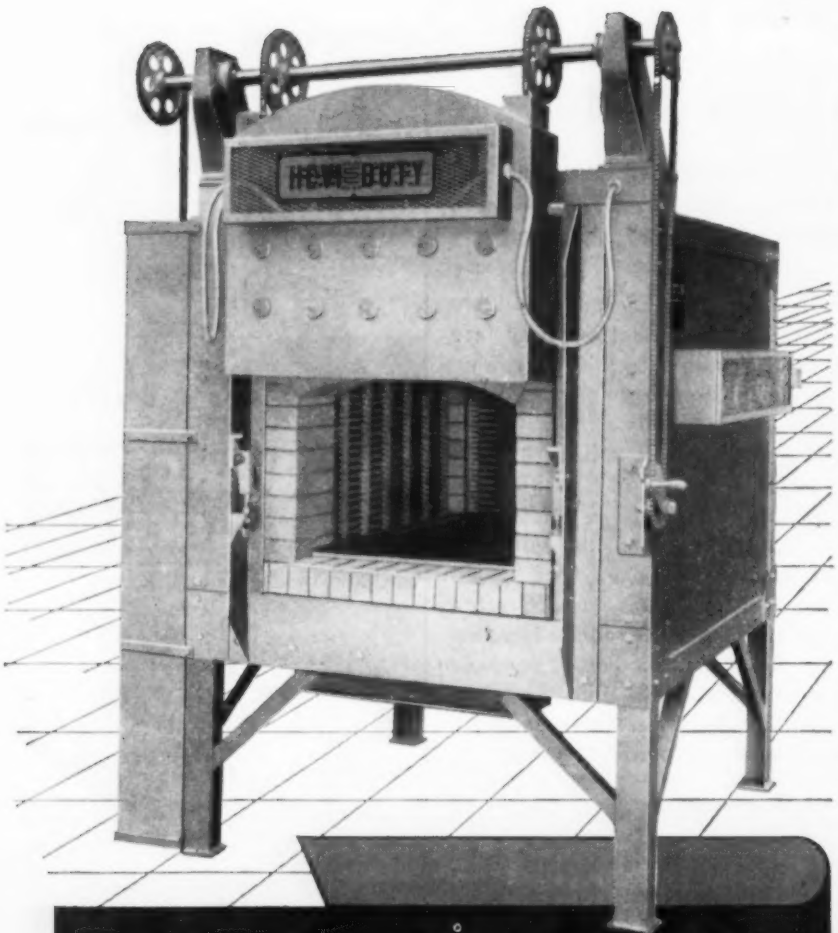

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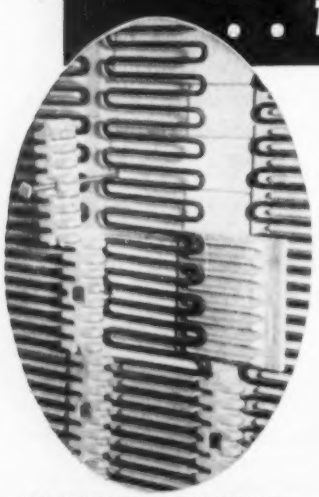

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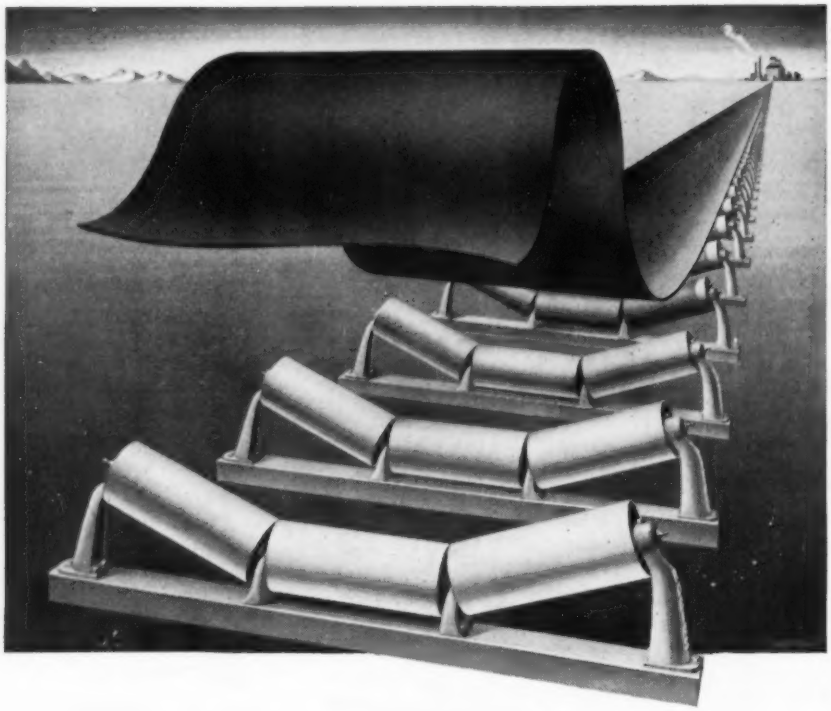
BITS AND BRIEFS

By Bill Packard

NPA's small business program won't keep the little guy out of Washington. What small business needs is less praise and more business . . . Another Donnybrook shaping up in Ohio legislature over H. B. Stewart, Jr.'s plan to link Ohio River with Lake Erie by belt conveyer. Suggested title, "Opposition Railroads" . . . Most satisfied man of the week—Ben Fairless breaking ground for U. S. Steel's huge new Fairless Works, biggest steel plant construction in history . . . **Alert to shipping departments: Your present troubles are only the beginning; freight car shortage will get worse, becoming supercritical at harvest time** . . . Your wife will ask, "Has the consumer price index been halted, or did it merely pause to catch its breath?" . . . Westinghouse President Gwilym Price conducts a good press conference; brings his key men along to meet the press and answer questions . . . **Allegheny-Ludlum-Pittsburgh Steel merger closer as both companies remove obstacles** . . . J. L. Beltz now editing his 100th issue of Thew Shovel's *Thew-Lorain News* . . . Meeting a steel friend in Washington we politely ask, "Do you get down here often?" "First time I've been here this week," he quips . . . General Motor's employment averaged 465,239 during 1950; payroll, 1.8 billion, an alltime high, report Charlie Wilson and Alfred Sloan, Jr., president and chairman . . . **Hot rumor: movies and television vieing for rights to film Washington investigations. Talent scouts already on the scene** . . . Construction this year will be only a little short of last year's $28 billion record. Industry and government projects will take up slack of fewer new homes . . . George Spatta, Clark Equipment president, looking for $12 to $15 million to finance expansion . . . M. A. Hanna net (12.32 a common share) set new

STAMPINGS
WE ARE READY TO ACT AS SUB-CONTRACTORS TO FURNISH YOU WITH HIGH QUALITY . . . PRECISION PARTS . . . QUICK DELIVERIES
Speed your output of defense orders. Let Garrett's extensive World War II experience in making Armed Forces parts and material produce your stampings. From a small part, produced on high speed presses, to a large television chassis Garrett has the plants . . . equipment . . . and "know-how" to turn out stampings by the thousands or millions.
COMPLETE EQUIPMENT FOR HIGH SPEED PRODUCTION
Our plants are equipped with the most modern automatic high-speed presses from 17 to 150 ton capacity. Stampings can be manufactured to your precise specifications from steel, stainless steel, aluminum, Alclad, brass and numerous other metals.
Up-to-date tool shop . . . plus complete finishing equipment—including tumbling, polishing, sand blasting, heat treating and plating equipment—assure you of quick deliveries and high quality.
FAST DELIVERIES . . . ONE SOURCE . . . ALL PARTS
Stampings, lock washers, flat washers (to Government Specifications), springs or hose clamps . . . Garrett makes them all . . . and gives you quick deliveries. Write for new helpful folders:
No. 006 STAMPINGS to Armed Forces Specifications
No. 005 "WASHERS" to Armed Forces Specifications
GEORGE K. GARRETT COMPANY, INC.
D & TIOGA STREETS, PHILADELPHIA 34, PA.
Manufacturers of
STAMPINGS . . . LOCK WASHERS . . . FLAT WASHERS
SPRINGS . . . HOSE CLAMPS
GEORGE K. GARRETT COMPANY INC.
BRANCH PLANT
ELLWOOD CITY PLANT (PITTSBURGH AREA)
MAIN OFFICE AND PLANT
PHILADELPHIA
Garrett
OF PENNSYLVANIA
MANUFACTURERS OF
STAMPINGS, LOCK WASHERS, FLAT WASHERS, SPRINGS, HOSE CLAMPS



EVER HEAR ABOUT OUR BACKBONE?

You are looking at a series of "troughing" idlers . . . the backbone of a Hewitt-Robins Belt Conveyor. Their concave design enables these idlers to cradle the belt they support . . . increasing its carrying capacity, reducing spillage, lengthening belt life.

The trough-shaped idler was invented in 1891 by Thomas Robins, Sr., founder of this company.

This is but one of a notable list of "firsts" to come from Hewitt-Robins. In belting . . . in machinery . . . in hose . . . in ingenious techniques for handling solid and fluid bulk materials . . . Hewitt-Robins always has pioneered.

Today, Hewitt-Robins is unique in another respect. It is the only organization in the world having, within one corporate structure, the complete belt conveyor "package": engineering, specialized machinery *and belting*. Only Hewitt-Robins can assume undivided responsibility for all the elements of a belt conveyor system; *only Hewitt-Robins makes them all.*

Hewitt-Robins can serve you through three industrial divisions—individually or collectively, according to your needs.

Whenever the handling of bulk materials is *your* problem, we invite you to make it ours.

HEWITT HR ROBINS

Executive Offices: 370 Lexington Avenue, New York 17, N. Y.

HEWITT RUBBER DIVISION: Belting, hose and other industrial rubber products
ROBINS CONVEYORS DIVISION: Conveying, screening, sizing, processing and dewatering machinery
ROBINS ENGINEERS DIVISION: Designing and engineering of materials handling systems

Hewitt-Robins is participating in the management and financing of Kentucky Synthetic Rubber Corporation

record for sixth straight year . . . **United Engineering & Foundry will build first continuous magnesium rolling mill for Dow Chemical** . . . Oft defeated Seaway proponents regrouping their forces for another try. Defense angle will be stressed.

Johnston OK's Escalator Rises Under Modification of Wage Reg. 6

Must be signed before Jan. 25 . . . First wage rises come on Mar 1.

Washington — Cost-of-living escalator clauses signed before Jan. 25 were approved last week under Economic Stabilization Administrator Eric Johnston's modification of wage Reg. 6. Washington resistance to labor's loud protest over escalator clause omission and boycotting of its government positions vanished and the first rises after controls went into effect Mar. 1.

Deferred Rise Out

Although the Bureau of Labor Statistics' tri-monthly price index was not due till this week, it was expected that cost-of-living rises would be from 4¢ to 5¢. The regulation bringing wage scales to a top 10 pct does not deter future escalator rises.

The modification does not protect deferred wage increases merely agreed to before Jan. 25.

President Truman is now seeking a positive reconciliation with labor and he may call union chiefs to Key West for a brass tacks conference.

Adjustment of wages scales, to bring pay up to a maximum of 10 pct above the freeze, was first permitted under wage Reg. 6, which was signed by Mr. Johnston despite opposition of the three WSB labor members.

Also, under Reg. 6, fringe benefits such as pensions and health plans which were agreed upon last year were not to be counted against the allowable 10 pct. Johnston has recommended that the order be revised to extend this exemption to future negotiations for an indefinite period.

pending further study. He holds that fringe benefits as such do not necessarily add to purchasing power and inflation.

In addition, the WSB has been instructed to move quickly in setting up procedures by which tandem wage adjustments, interrupted by the Jan. 25 freeze, could be continued within limitations and with approval of ESA. Such procedures are also to be established for handling hardship and inequity appeals as well as for rules governing wage schedules in new plants.

Materials Shortage Worsens Manpower Problem for Foundries

Birmingham—The case of one scarcity aggravating a more serious shortage was cited by foundrymen attending the 19th annual Foundry Practice Conference of the American Foundrymen's Society held here recently.

Materials shortages, especially in pig iron, is increasing the more serious problem of manpower by forcing foundries to slower operating pace, said foundrymen. Their workers then leave for more lucrative, full-time jobs. Industry spokesmen said foundries have been modernized and are in better shape than in 1940. About 1300 foundrymen and members of related industries attended.

Underground Natural Gas Storage

Washington—Permission to construct a huge underground natural gas storage area in the Hebron field, Pa., is being asked of the Federal Power Commission.

The applicants, Tennessee Gas Transmission Co. and United Natural Gas Co., say the project would cost nearly $8 million and would require about 90,000 ft of pipe and related materials. About 70 wells and 70 measuring stations would be required.

Rheem to Make Depth Charge Cases

Chicago—Depth charge cases will be manufactured, starting immediately, by the Rheem Mfg. Co. plant here under a Navy contract.

For specialty wires—a specialty mill
Wires as fine as .003″ made to meet your exacting specifications by Johnson specialists, quality producers of:
MUSIC SPRING WIRE.
AIRCRAFT CABLE WIRE.
BRUSH WIRE FOR HAND AND POWER BRUSHES.
HOSE REINFORCEMENT WIRE (BRAIDED TYPE).
VACUUM HOSE WIRE.
FLAT AND HALF OVAL SPECIAL SPRING WIRE.
OIL TEMPERED SPRING WIRE.
HARD DRAWN SPRING WIRE.
HIGH CARBON ROPE WIRE.
HIGH TENSILE GALVANIZED STEEL WIRE.
Bright drawn, tinned, galvanized, liquor finish, copper coated, bronze plated, alloy coated.
Johnson sets the standard of the industry
JOHNSON
STEEL AND WIRE COMPANY, INC.
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New York Philadelphia Cleveland Detroit Akron Chicago
Atlanta Houston Tulsa Los Angeles Toronto

CHEER UP!

THE

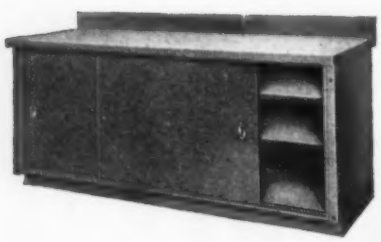
HALLOWELL

CABINET BENCH

is worth waiting for...

The HALLOWELL Cabinet Bench has more "custom" features than any other stock bench we know of. All-steel construction, several top materials, ample storage space, standardized multiple units and accessories and true good looks make it well "worth waiting for."

WRITE FOR BULLETIN 702



-SPS-

STANDARD PRESSED STEEL CO.

JENKINTOWN 17, PENNSYLVANIA

STEEL CONSTRUCTION NEWS

Fabricated steel awards this week included the following:

3000 **Tons,** various locations, beam bridges and maintenance for Pennsylvania Dept. of Highways, to Bethlehem Steel Co., Bethlehem.

1060 **Tons,** Montgomery County, Pa., highway bridges for Pennsylvania Dept. of Highways, F. A. Canuso & Son, general contractor, to American Bridge Co., Pittsburgh.

1000 **Tons,** Morrisville, Pa., transmission line towers for Philadelphia Electric Co., to American Bridge Co., Pittsburgh.

750 **Tons,** Bethesda, Md., boiler house and incinerator for National Institute of Health, to Le Cate & Co., Delmar, Del.

690 **Tons,** Comru, Pa., RR bridge 6/11 for the Reading Co., to American Bridge Co., Pittsburgh.

390 **Tons,** Trafford, Ala., continuous girder span bridge over Locust Fork of Black Warrior River, Alabama Highway Department, to Virginia Bridge Co., Birmingham.

250 **Tons,** Waynesboro, Va., addition to plant of E. I. du Pont de Nemours & Co., to Belmont Iron Works.

230 **Tons,** Weston, N. J., RR bridge 57-66 east of city for the Reading Co., to Bethlehem Steel Co., Bethlehem.

Fabricated steel inquiries this week included the following:

6712 **Tons,** Charlestown, a part of Boston Mass., portion of the new Boston Central Artery. Single and double deck elevated highway structure with approaches from Charles River Bridge to Wapping st. abutment of the Mystic River Bridge. Bids due March 20, 1951. (6712 tons include structural carbon and silicon steel).

2100 **Tons,** Philadelphia, Bldg. No. 10 for the Philco Corp., bids due Mar. 9.

412 **Tons,** Ocean County, N. J., highway bridge for New Jersey State Highway Dept., bids due March 13.

Reinforcing bar inquiries this week included the following:

1800 **Tons,** Ft. Randall, N. D., reservoir U. S. Engineers.

1514 **Tons,** Charlestown (Boston), portion of new Boston Central Artery. Bids due March 20, 1951.

460 **Tons,** Maywood, Ill., Congress Street expressway.

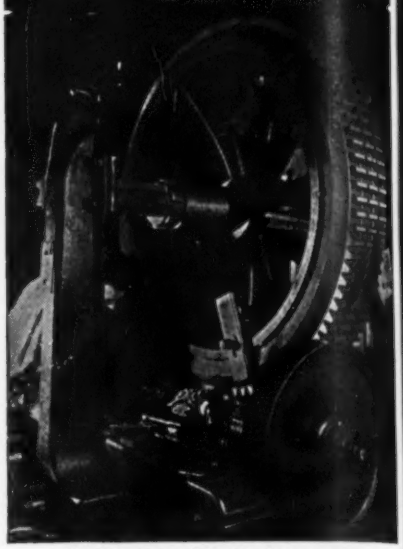
350 **Tons,** Chicago, apt. bldg. 70th Place and South Shore Drive, Frank Schmidt Construction Co., contractor.

Pickets Appear; TCI Banks Fires

Birmingham—Picketing and a strike of 4000 USW ore miners forced Tennessee Coal, Iron & Railroad Co. officials to suspend operations at all plants except the Bessemer rolling mill last Monday. If picketing spread to the Bessemer plant, that was scheduled to be shut down, too.

The strike started at the firm's Fairfield ore plant last week and spread to the Dolonah and Wenonah divisions. Union officials said the miners protest hiring of new men for new jobs created by mechanization of mines instead of promoting from the ranks. They said the company insists that, since the jobs are newly-created, it can put in new personnel.

LARGE CUT GEARS



Cutting three identical spur gears simultaneously at Simonds Gear.

Cut Gears for Industrial Needs!

For special gears in larger sizes—exact duplicate gears for replacements—for every heavy-duty industrial gear application—look to SIMONDS GEAR where specialty gears for heavy industry have been a custom service for more than 50 years. Within easy shipping distance of many heavy industry plants—with a personalized service designed to meet your most exacting specifications—SIMONDS GEAR provides an unusually prompt and efficient service on even the most unusual gear requirements. Sizes range up to 145" dia. in all popular gear-making materials. Send your inquiry today and get acquainted with SIMONDS GEAR Service.

SPUR GEARS

BEVEL GEARS • MITRE GEARS

WORMS • WORM GEARS

RACKS • PINIONS

SIMONDS GEARS

Stock carrying distributors for Ramsey Silent Chain Drives and Couplings. V-Belts.

THE SIMONDS GEAR & MFG. CO.

LIBERTY at 25TH PITTSBURGH 22, PA

500 tons a day

THAT'S pig iron going into the gondola. It comes from the blast furnace of Eastern Gas and Fuel Associates, Everett, Massachusetts.

Before they bought their American DiesELectric, Eastern used a steam crane for this work. It was light for the job and required constant repairs resulting in a large loss of productive time. During operation, production was lost while the crane made frequent stops for refueling. When the steam crane was not required on the job, additional manpower was needed to clean and keep the fire going to maintain steam in the boiler.

The DiesELectric, with diesel power to the deck, electric power to the wheels, does much more work with fewer man hours. It loads 500 tons of pigs a day; switches full cars out, empties in. Starts work at the push of a button . . . and keeps going without interruption. Fuel cost for a day is about the price of a good lunch.

Maybe *you* should have an American DiesELectric. Why not mail the coupon, for additional facts.

Modernize...economize...with

American Hoist
& Derrick Company
ST. PAUL 1, MINNESOTA

70 **Mail this coupon** 1602

American Hoist & Derrick Co.
St. Paul 1, Minnesota

● Please send literature on

AMERICAN DIESELECTRIC LOCOMOTIVE CRANES

NAME_____

COMPANY_____

ADDRESS_____

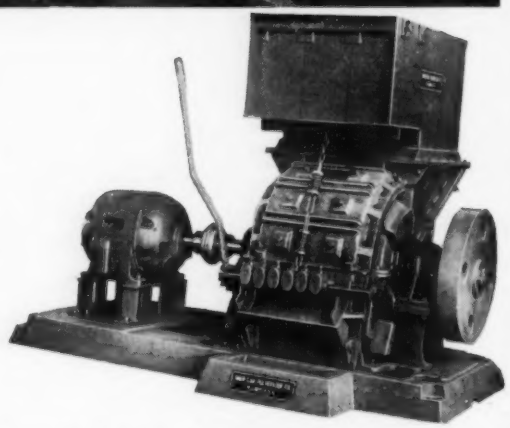
CITY_____ STATE_____

TIMKEN TURNS METAL SCRAP INTO EXTRA PROFITS

This "busy-looking" American Crusher #3800 is one of five used by the Timken Roller Bearing Company in processing 28,198 tons of metal turnings last year at its Canton, Ohio plant.

AMERICAN
METAL TURNINGS
CRUSHERS

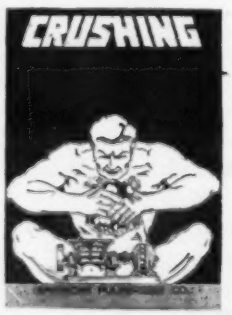
pay off in
3 ways . . .



1. TOP SCRAP VALUE. With scrap prices rising, the uniform short shoveling lengths produced by Americans are bringing $2 to $3 per ton more than machine shop turnings.

2. INCREASED CUTTING-OIL RECOVERY. Up to 50 gallons per ton are released from turnings that have been reduced by American Crushers.

3. EASIER HANDLING, STORAGE. American-reduced chips lend themselves to better briquetting . . . require a fraction of the usual storage space.



American Metal Turnings Crushers are designed to reduce turnings of alloy steel, carbon steel, aluminum, brass, bronze, etc. quickly and economically. Available in capacities from 1 to 10 TPH.

WRITE for Bulletin on Metal Turnings Crusher

American PULVERIZER COMPANY
Originators and Manufacturers of Ring Crushers and Pulverizers
1439 MACKLIND AVE.
ST. LOUIS 10, MO.

publications

Continued from Page 36

chrome films are available without charge for one-time showings, details for which are given in the folder. Prices for permanent use are also listed. *Federal Products Corp.*

For free copy insert No. 8 on postcard p. 37

Tubes With Fins

Brown integral one-piece Fintubes are covered in a new 8-p. bulletin describing the construction of these integral extended surface finned tubes. The booklet lists the range of sizes and materials available, and illustrates the wide variety of heating and cooling applications in which they are used. Helpful engineering data is presented, including design curves and comparative data between bare pipe and longitudinally finned pipe or tubing. *Brown Fintube Co.*

For free copy insert No. 9 on postcard p. 37

Remote Control Dictation

The new Televoice system for remote control dictation is described in a new 12-p. booklet covering the entire system and explaining its advantages. The system consists of 1 to 20 telephone-like dictating stations wired to a central recording instrument. The booklet points out that dictation costs are cut to the bone, bringing the cost per dictator served to an average one-third of the cost of individual dictating machines. Other features described are its proven success in actual use, its complete simplicity and foolproof operation. *Thomas A. Edison, Inc.*

For free copy insert No. 10 on postcard p. 37

Drilling Data

The new 36-p. booklet, "More Holes in a Hurry," gives a complete working knowledge of portable electric drills, their care, and how and where to use them. In it are valuable tips on how to finish jobs faster and do them better. Special emphasis has been placed on industrial and agricultural applications for portable electric drills, with several sections devoted to an explanation of technical drilling operations and the proper drilling of various materials. Tables

Turn to Page 126

Letters and Wires
Now Pouring in—

"MORE BRAD FOOTE GEARS —PLEASE RUSH!"

...so American Gear

SWINGS INTO ACTION

Demand for Brad Foote Gears has been heavy—continuous—growing bigger daily . . .

● So we're converting the complete facilities of **American Gear & Manufacturing Company**, now a fully-owned subsidiary of BRAD FOOTE GEAR WORKS, INC., to the production of gears also. These gears will be equal in every way to BRAD FOOTE in engineering, design and quality... and fully up to BRAD FOOTE's known standards of cooperation and delivery.

AMERICAN GEAR & MANUFACTURING COMPANY is a smart, modern, fast-moving, going concern located in Lemont, Illinois. It comprises 56,000 square feet of space, 11 acres of land, and is served by spurs of two railroads and by the Drainage Canal.

AMERICAN will help meet gear production shortage. It will pay you to investigate.

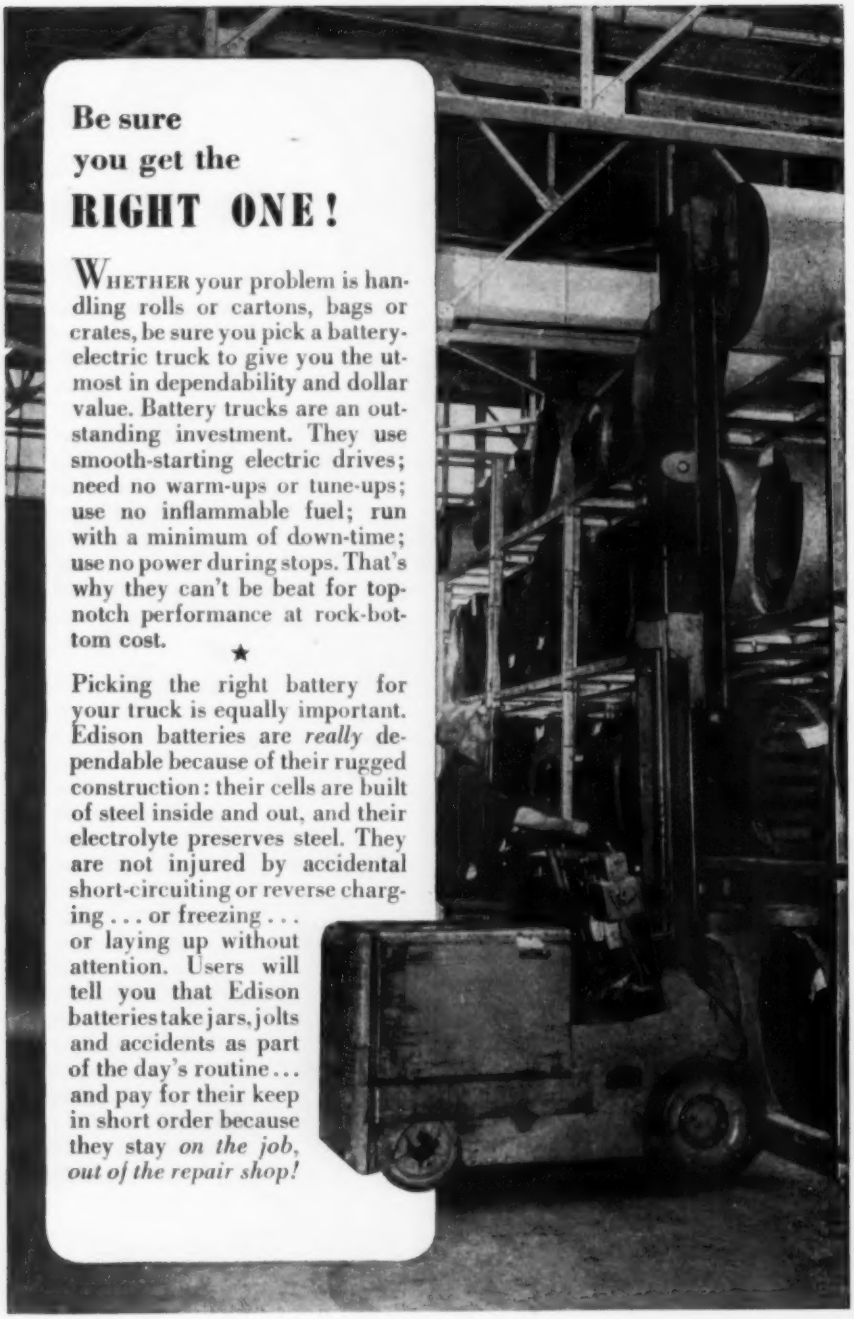
American Gear & Manufacturing Company

LEMONT, ILLINOIS

a Subsidiary of

BRAD FOOTE GEAR WORKS, Inc.

1309 SOUTH CICERO AVENUE, CICERO 50, ILLINOIS



Be sure you get the

RIGHT ONE!

WHETHER your problem is handling rolls or cartons, bags or crates, be sure you pick a battery-electric truck to give you the utmost in dependability and dollar value. Battery trucks are an outstanding investment. They use smooth-starting electric drives; need no warm-ups or tune-ups; use no inflammable fuel; run with a minimum of down-time; use no power during stops. That's why they can't be beat for top-notch performance at rock-bottom cost.

★

Picking the right battery for your truck is equally important. Edison batteries are *really* dependable because of their rugged construction: their cells are built of steel inside and out, and their electrolyte preserves steel. They are not injured by accidental short-circuiting or reverse charging . . . or freezing . . . or laying up without attention. Users will tell you that Edison batteries take jars, jolts and accidents as part of the day's routine . . . and pay for their keep in short order because they stay *on the job, out of the repair shop!*

WRITE TODAY for free booklet SB 2039 and a current price quotation. You'll find Edisons cost little more than other makes of batteries . . . and they pay this back over and over in terms of low upkeep and long, long life.—*Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey. In Canada, International Equipment Company, Ltd., Montreal and Toronto.*

EDISON

Nickel · Iron · Alkaline

STORAGE BATTERIES

Typical Truck Battery

production ideas

Continued from Page 40

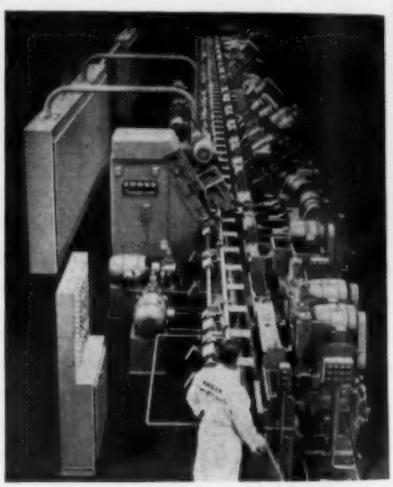
feed method is used mostly for grinding thread gages, spindles, worms and long thread taps and when the length of the thread is more than 1.575 in. The in-feed method is for production grinding of small thread taps, thread milling cutters, thread chasers and threads on screws, bolts or similar parts requiring ground finishes. The grinder admits workpieces between centers up to 28 in.; grinds threads to a maximum length of 17½ in., from 0.120 to 8 in. thread diam, with a pitch range from 60 tpi to 3 in. Grinding wheel speeds are 1550 or 1900 rpm and work spindle speeds range from 1.6 to 80 rpm. The grinder operates on 220 and 440 v, 3 phase, 60 cycle current. *Cosa Corp.*

For more data insert No. 33 on postcard, p. 37.

Special Machine Tool

90-ft Transfer-matic drills, mills, taps automatic transmission cases.

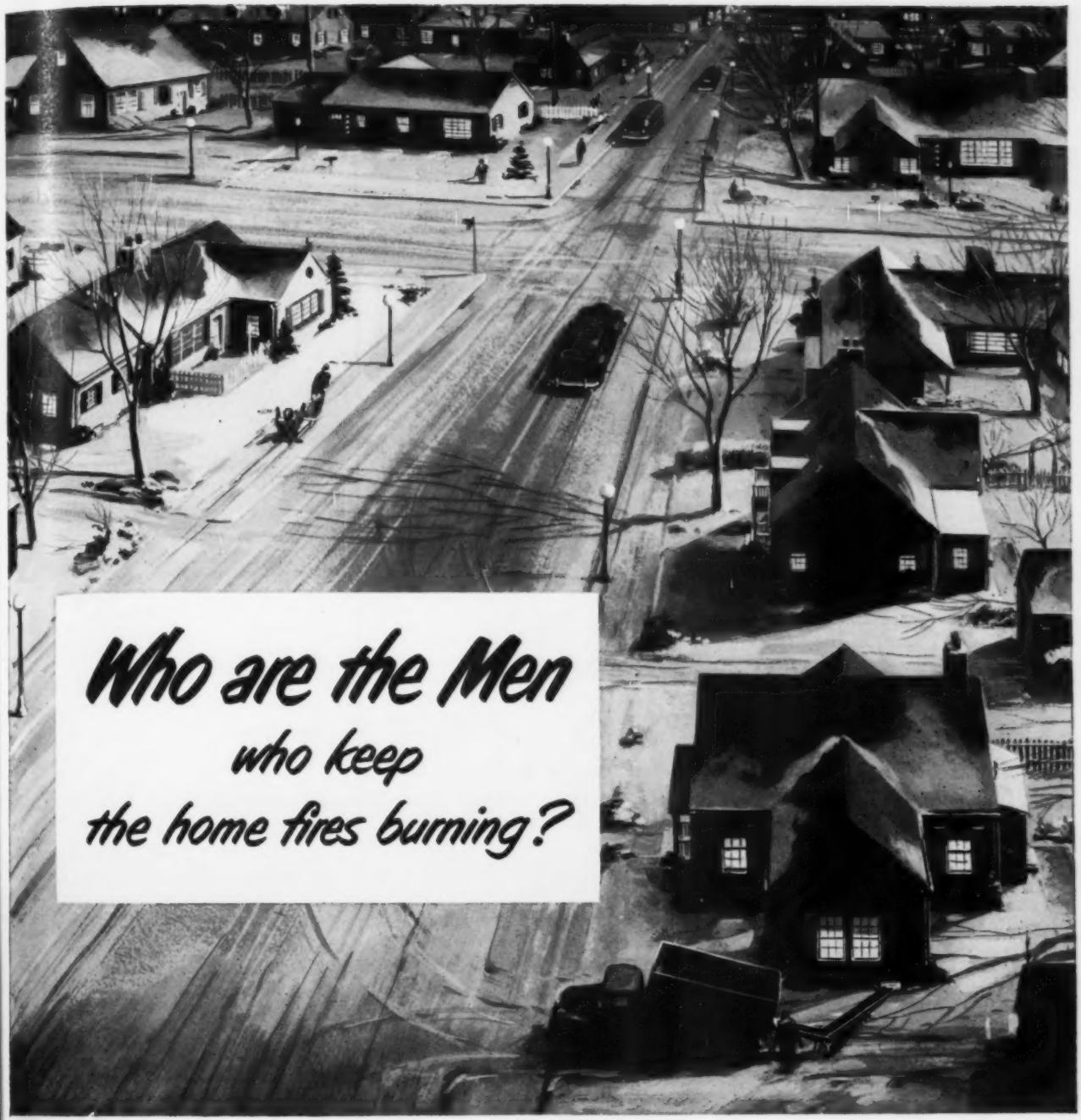
The machine performs 104 operations on 86 automatic transmission cases per hr at 100 pct efficiency. Fifty-four stations include 1 loading, 6 milling, 23 drilling, reaming



and counter-boring, 2 tapping, 21 inspection, 1 unloading. In normal operation, it takes one transmission case almost an hour to progress through all stations. Only one unskilled operator is required to load and control the operations. The Cross Machine Control Unit with Toolometer is incorporated in the machine. *Cross Co.*

For more data insert No. 34 on postcard, p. 37.

Turn to Page 138



They are America's local coal merchants—in city and village across the nation. Nearly 18 million homes . . . more than half of all the homes in the country . . . are heated by the coal they supply!

They bring healthful heat to homes and offices, schools and hospitals, stores and workshops. They buy, store and deliver over 90 million tons of bituminous coal a year . . . close to one-fifth of all the bituminous coal mined in America.

Today, as always, coal is America's *basic* fuel!

And coal is just as essential—to essential industry! Steel—electric power—railroad transportation—rubber—chemicals . . . all depend on coal!

The producers of coal have always recognized their responsibility to help power the progress of America. And today, the coal industry is ready and able to do its part in fueling the nation's all-out defense program.

For private management has had the vision to invest hundreds of millions of dollars in up-to-date preparation plants —improved equipment—research and new mine properties. Under free competition, progressive mine operators have developed the most efficient and productive coal industry in the world!

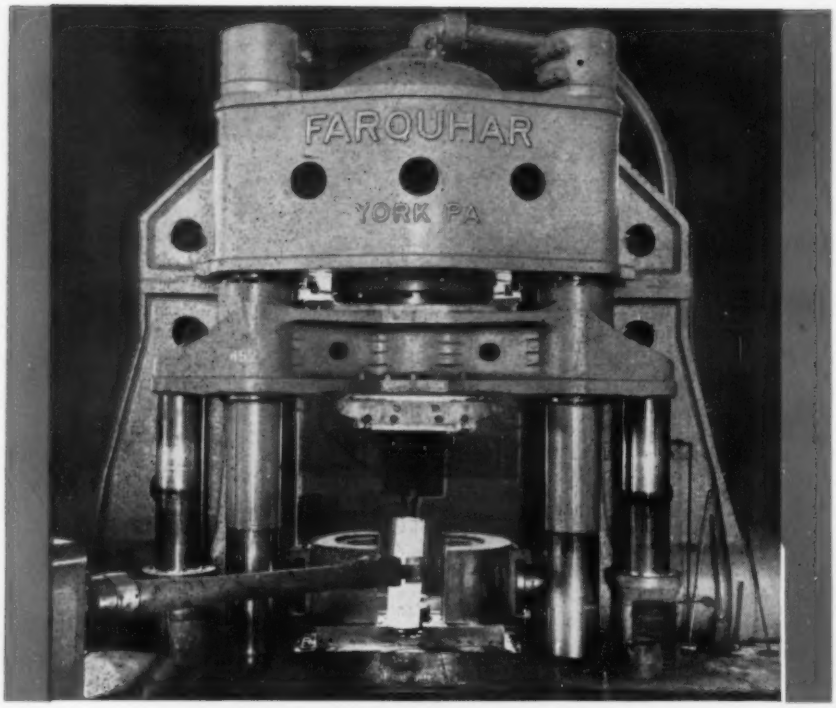
With a continuing supply of necessary equipment, transportation and trained man power, America's independently owned and operated coal mines will produce all the coal that's needed to continue to power the nation's progress, in peace or war.

BITUMINOUS COAL

BITUMINOUS COAL INSTITUTE

A DEPARTMENT OF NATIONAL COAL ASSOCIATION

WASHINGTON, D. C.



FARQUHAR HYDRAULIC PRESS

turns out better forgings *faster* for Cameron Iron Works

This Giant 5000-ton Farquhar Hydraulic Press has a big job to do at the Cameron Iron Works, of Houston, Texas—and it's doing it!

Cameron needed faster and better production of tubing head spools which are used in the oil industry for capping wells. These parts had formerly been produced from steel castings. By using the built-to-specification Farquhar Press to turn out 800-lb. forgings of the spools instead, Cameron speeded up production, saved time and labor.

Advantages of forgings by the Farquhar Press over the castings are: Cheaper to produce . . . Free from porosity . . . Uniform in physical properties . . . Controlled in grain structure. Cameron gets higher quality at lower costs for this operation—still can convert the press for other production jobs in the future.

Farquhar Presses Cut Your Costs

Just one more example of cost-cutting Farquhar performance in heavy production. Farquhar Presses are built for the job . . . presses that assure faster production due to rapid advance and return of the ram . . . greater accuracy because of the extra guides on moving platen . . . easy, smooth operation with finger-tip controls . . . longer die life due to positive control of speed and pressure on the die . . . long, dependable service with minimum maintenance cost!

Farquhar engineers are ready to help solve whatever production problem you may have. Give them a call.

Send for Free Catalog showing Farquhar Hydraulic Presses in all sizes and capacities for all types of industry. Write to: A. B. FARQUHAR Co., *Hydraulic Press Division*, 1503 Duke St., York, Pa.

GET THE DETAILS on how our Deferred Payment Plan helps you pay for your Farquhar Hydraulic Press out of the savings it produces!

Farquhar
HYDRAULIC PRESSES
for Bending • Forming • Forcing • Straightening • Assembling • Drawing
Extruding • Joggling • Forging • and other Metal-working Operations

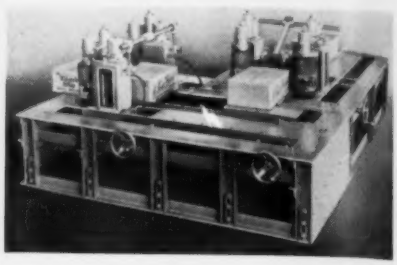
production ideas

Continued

Case-Printing Machine

Automatically prints display designs on 4 sides of cases.

A new packaging line case-printing machine is designed to make it practical for companies with varied product lines to print their own cases as they use them. With sharp, uniform printing press quality of reproduction, the Marko-printer is



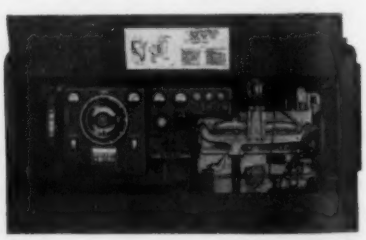
placed in a production line following an automatic case sealer or packing station. The machine automatically receives loaded cases, separates them for registration, prints from 1 to 4 side panels (and top, too, if required) discharges them to the next operation, all in a single pass, at production rates up to 2000 cases per hr. Marko-printers are built to meet the user's special requirements. A typical machine has a range of case sizes from 3x6¼x6½ in. to 10x15x18 in. *Adolph Gottscho, Inc.*

For more data insert No. 35 on postcard, p. 37.

Arc Welder

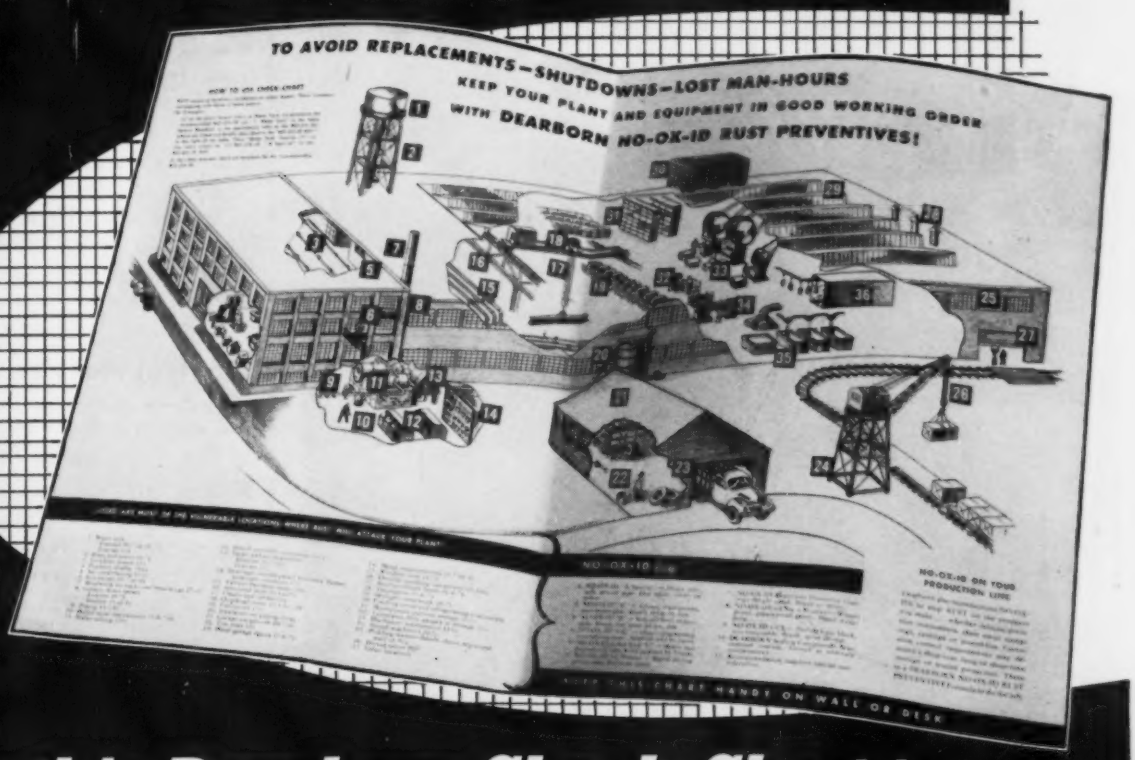
300 amp gasoline engine driven, has 3 kw auxiliary power generator.

This arc welder and power generator is a self-contained unit, powered by a six-cylinder self-start-



ing Chrysler industrial engine directly connected to the welding generator and mounted on a welded steel frame. An auxiliary 3 kw power generator provides for lights and such tools as a lathe, grinders, drills, brake reliner, valve refacer, chipping hammers, power wrenches,

RUST *threatens your plant!*


TO AVOID REPLACEMENTS—SHUTDOWNS—LOST MAN-HOURS
KEEP YOUR PLANT AND EQUIPMENT IN GOOD WORKING ORDER
WITH DEARBORN NO-OX-ID RUST PREVENTIVES!
NO-OX-ID ON YOUR PRODUCTION LINE

Use this Dearborn Check-Chart to stop rust before it starts!

Rust threatens your plant . . . every minute of the day . . . every day of the year!

It is no longer easy to replace rusted-out tanks, boilers, bridges, gutters, skylights . . . other metal structures. Protect the vital metal equipment both inside and outside your plant. Prevent production delays . . . costly shutdowns . . . wasted man-hours.

Dearborn has prepared a simple check-chart that flags the danger spots where rust threatens your plant . . . explains how you can quickly, surely *stop rust before it starts* with Dearborn NO-OX-ID Rust Preventives. Investigate this service—furnished without cost—today.

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NO-OX-ID
IRON + OX = RUST

THE ORIGINAL RUST PREVENTIVE

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Send for your copy of the Dearborn Check-Chart . . . an easy-to-use, complete guide to rust prevention. Or, if you prefer, a Dearborn representative is ready to assist you in the eternal war against rust, the ever-wakeful, always alert enemy of your plant. The coupon is for your convenience.

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Please send ☐ Dearborn Check-Chart.
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ROSS Series 100 CARRIER

...simplest mass handling method known!

Now... you can move 45,000-pound payloads of billets, bars, plate, in-process and finished steel *where* you want them *when* you want them... at a moment's notice!

Now... you can be free of the restrictions of a plant railroad handling system... its expensive trackage, cars, locomotives... costly, time-consuming switching operations!

Now... you can prevent congestion in the mill... free more mill space for production operations... eliminate costly re-handling ... save time and money in getting out current orders!

How? With Ross Series 100... the *only* Carriers designed and built all the way through for rough, tough steel mill service... the *only* Carriers with that great reserve strength steel men demand. Self-loading and unloading, Ross Series 100 requires only a driver... and moves capacity loads at speeds up to 33 mph.

Don't overlook the outstanding advantages of the Ross Carrier Steel Handling Method... ASK STEEL MEN WHO *KNOW!* Get full details on Ross Series 100 Carrier... a 'phone call, wire or letter will do it.

Rely On ROSS

THE ROSS CARRIER COMPANY

Direct Factory Branches and Distributors Throughout the World

425 Miller St., Benton Harbor, Michigan, U.S.A.

production ideas

Continued

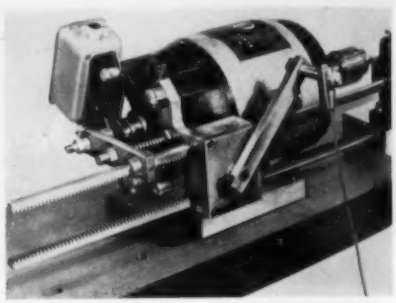
and paint sprayers. The unit is enclosed by a sheet metal canopy that is directly bolted to the frame making it suitable for field repair and maintenance jobs. The welding generator is rated at 40 v, 300 amp under 1 hr resistance load at 1500 rpm and has a current range from 50 to 400 amp. *Hobart Brothers Co.*

For more data insert No. 36 on postcard, p. 37.

Control Mechanism

Controls motor shaft and tool travel on countersinking machine.

The latest model Black countersinking and deburring machine is equipped with a new positive-type tool actuating mechanism that permits precision operation on a variety of work up to the full 20-in.



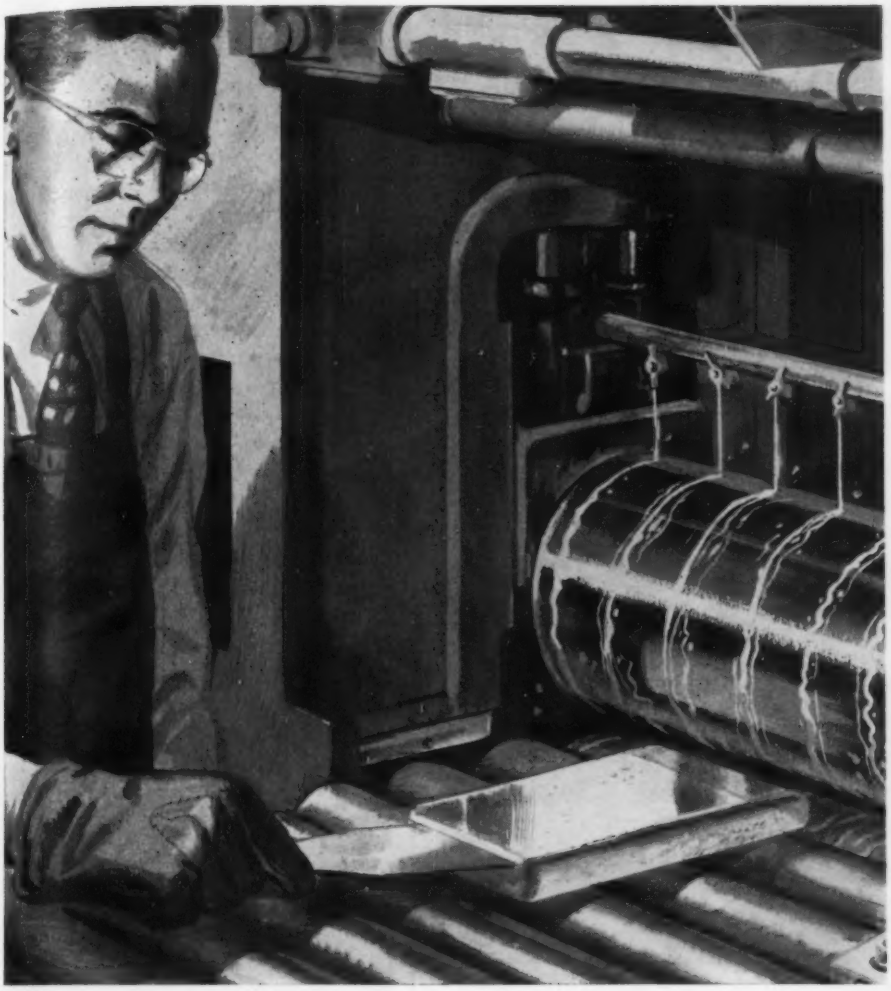
capacity of the machine. The control is a double rack and pinion traversing mechanism operated by a foot treadle. Each rack carries an arm fitted with a micrometer adjusting stud which transmits pressure to the motor shafts. These arms are adjustable by set screws to any rack position, while an adjustable stop on the lower rack limits the travel of both motor shafts. Operation of the machine is simple. *Black Drill Co.*

For more data insert No. 37 on postcard, p. 37.

Frequency-Time Counter

Universal 6-in-1 measuring equipment has two electronic counting chains.

Designated as the Model 801 Megacycle Frequency-Time Counter, the instrument can be used for frequency measurements, time interval measurements and frequency ratios. In addition it can be used as a secondary frequency standard, a 1 megacycle totalizing electronic



"Tom Thumb" proving ground—for you!

THE illustration above gives you some idea of the miniature laboratory mill operated by Kaiser Aluminum.

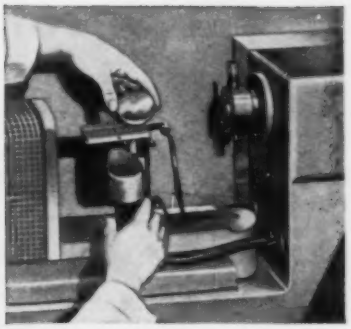
In it, alloys are tested to determine how they will behave under rolling-mill conditions. It also helps develop new alloys to ease problems of fabrication. And it helps work out methods for better plant control of processes.

The lessons learned are applied in producing the aluminum sheet, circles or coils that go to *you*.

Such practical research as this—combined with unsurpassed quality and service—explains why Kaiser Aluminum has earned the confidence of thousands of manufacturers of hundreds of different products.

• • •

To help meet critical aluminum needs, Kaiser Aluminum has begun a vast expansion program which will greatly increase production of primary aluminum. When conditions permit, this aluminum will be shared by manufacturers of civilian products. Meanwhile, if you have aluminum fabrication problems, call any office listed below.



METALLURGICAL LABORATORY. Kaiser Aluminum's automatic quantometer analyzes samples of metal still in furnaces. Thus, when Kaiser Aluminum is poured every ingot measures up exactly to rigid specifications.

METALLOGRAPHIC LABORATORY analyzes magnified specimens of Kaiser Aluminum to make sure chemical structures coincide with the uses to which alloys will be put by you.

CHEMICAL LABORATORY makes frequent analyses to maintain the high quality that Kaiser Aluminum customers always get.

PHYSICAL TESTING LABORATORY makes sure all Kaiser Aluminum customer specifications are met exactly. Samples of every order are tested for tensile and yield strength, fatigue properties, grain size, hardness, etc.

Kaiser Aluminum

Setting the pace . . . through quality and service

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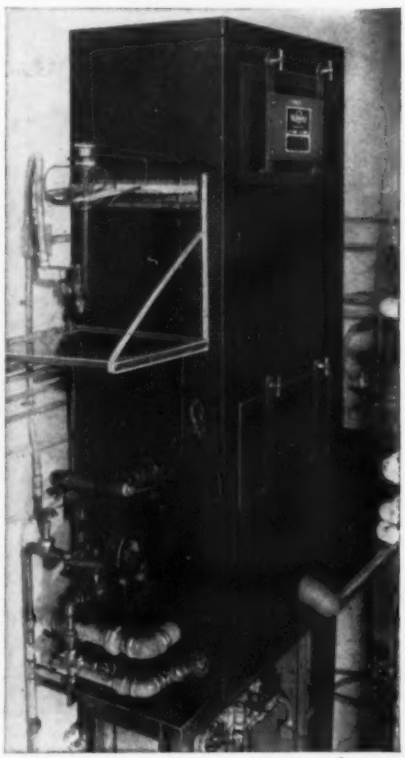
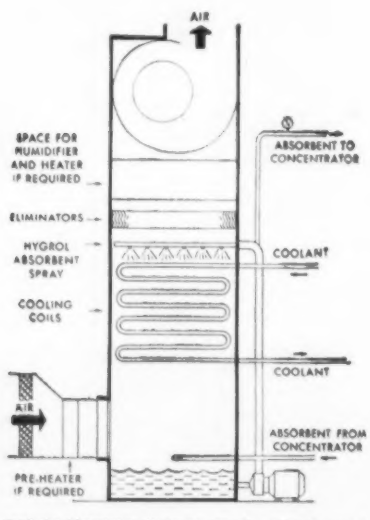
New "Controlled Humidity" Method Gives a Better Solution to Air Conditioning Problems

"Hygrol" Absorbent Liquid Dehumidifies Fresh Air Without Refrigeration



NIAGARA Air Conditioners or Dehumidifiers using "Hygrol" liquid absorbent give precise control of air temperature and humidity... at lower operating cost, with large savings in space and with smaller and less expensive equipment, in many applications.

This method dehumidifies the air by passing it through a chamber in which "Hygrol" spray removes its moisture and produces a low dew point. The "Hygrol" solution resulting is continuously and automatically re-concentrated. providing always full capacity in air conditioning and assuring always a constant dehumidifying capacity and a trustworthy, constant condition for your material, apparatus, process or room to be conditioned.



NIAGARA CONTROLLED HUMIDITY METHOD — FLOW DIAGRAM

Write for Bulletin 112

"Hygrol" is a liquid, not a salt solution; it stays pure and non-corrosive; it does not cause maintenance or operating troubles in food plants or in chemical processes.

Investigate this new Niagara Method for "comfort" air conditioning as well as to protect quality in hygroscopic material, or processes or instruments, or to prevent condensation damage to metals, parts or products.

NIAGARA BLOWER COMPANY

Over 35 Years Service in Industrial Air Engineering

Dept. IA, 405 Lexington Ave. **New York 17, N. Y.**

Experienced District Engineers in all Principal Cities

production ideas

Continued

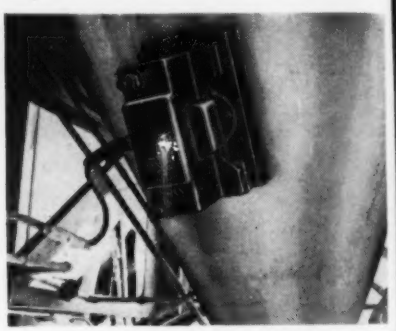
counter and a direct reading rpm tachometer. The instrument incorporates two complete electronic counting chains, a 100,000 cycle per sec crystal oscillator frequency standard and unique electronic switching and gating circuits. Frequency measurements up to 1 million cycles per sec may be made in a few seconds with a minimum accuracy of 0.001 pct. Two methods of measurement may be used. *Potter Instrument Co.*

For more data insert No. 38 on postcard, p. 37.

Semi-Noiseless Vibrator

Metallic striking parts eliminated; springs pound against rubber bumper

New semi-noiseless electric vibrators perform the same function as the standard models, with a sharp reduction in the operating noise, making them useful on interior bins, hoppers and chutes where large numbers of employees



are working. They are available in four models with capacities ranging for use on small hoppers containing 20 cu ft of material to bunkers holding hundreds of tons. They operate from 110 v, 220 v or 440 v, ac. Intensity of vibration can be regulated by a variable vibration controller. *Syntron Co.*

For more data insert No. 39 on postcard, p. 37.

Hydraulic Filter

For use wherever dirty liquids are collected and recirculated.

A new Staynew hydraulic filter is suited for application on machine tools, conveyers, hydraulic presses and other types of cutting tools and hydraulically operated machines. The filter has three major parts: lower end plate, Staynew radial fin insert and combined supporting

52100 steel is ideal for all these parts

1. Diesel injection pumps
2. Lathe centers
3. Slitting rolls and knives
4. Cam rollers for automotive steering gears
5. Machine tool parts
6. Pump parts
7. Aircraft engine parts
8. Mechanical seals
9. Saw mill rollers
10. Anti-friction bearings
11. Asbestos disintegrators
12. Mill rolls

. . . and for others like them

Need a steel that's hard, tough, and easy to machine? 52100 steel is the answer. It's a high-fatigue-strength, high-tensile-strength steel that can be oil-quenched in moderate sections to a maximum hardness of Rockwell C65/66. 52100 withstands working pressures of 200,000 p.s.i. And because of its fully spheroidized structure, it offers excellent machining characteristics.

52100 steel is available in bars, tubes and wire—and The Timken Roller Bearing Company, one of the world's largest producers of 52100 steel, is the *only* source of *all three.* A wide range of sizes in each form is made to meet your needs.

We maintain a mill stock of 52100 tubing to fill small run requirements. You can select from 101 sizes, ranging from 1″ to 10½″ O.D. and get shipment within 24 hours after the receipt of your order. Complete, rigid quality control in the Timken Company plant assures you of uniform quality in every shipment.

Originally developed for anti-friction bearings, 52100 steel offers big advantages for any machined part requiring great strength and resistance to wear. For a stock list of available sizes, grades and finishes, write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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Fine Alloy

STEEL

and Seamless Tubes

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing

where wages and hours didn't count

Slowly shaping his log canoe, the savage punched no time clock, expected no fringe benefits. Even our most backward manufacturing has come a long way from that cost-unconscious era, but in many a plant there's still room for new, labor-saving (thus cost reducing) practices.

A modern Clearing press, with a single stroke, can create in a few seconds all the "added value" that used to require many, many man hours. Put your basic economics to work on *that* equation—then get in touch with Clearing for some helpful suggestions about *your* production problems.

CLEARING MACHINE CORPORATION

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Making aluminum boats on a Clearing press.

CMC CLEARING

CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

tube and upper end plate with threaded outlet sleeve. The entire unit may be disasssembled in 30 sec, and insert replaced at low cost or cleaned with solvent or brush. In most cases the filtering medium is 100 mesh stainless steel wire; other media are available. *Dollinger Corp.*

For more data insert No. 40 on postcard, p. 37.

Lubricant Kit

For reloading individual bearings and centralized lubricating systems.

The LubriKit consists of an electrically operated barrel pump, mounted on a 400-lb grease drum for the filling of grease reservoirs, a hand transfer pump on a 100-lb

drum for the delivery of oil and a tool box containing hand tools, miscellaneous fittings and hand guns for the servicing of individual bearings. The necessary hose, nozzles and gages are included; all mounted on a steel base 30x60 in. *J. N. Fauver Co., Inc.*

For more data insert No. 41 on postcard, p. 37.

Melters Carbon Test

Determines carbon in mild steel baths in less than 1 minute.

Under the controlled conditions of the test, a hardness tester graduated in per cent carbon results to within 0.02 pct in the 0.05 to 0.45 pct carbon range. The equipment is designed to give long service directly on the melting floor. Valuable furnace time may be saved by eliminating waiting time for lab-

PHOTOGRAPH BY RUSSELL C AIKINS

You've got to have a real feeling for it . . . then you can tell by touch, sight, smell, and even taste (that is, *good* taste!) when Brass is at its best. And when it is, it's *Bristol* Brass . . . made by seasoned Brass men who *know how*. That's why you can bank on Brass sheet, rod and wire made by The Bristol Brass Corporation, Bristol, Conn., since 1850. Offices or warehouses in Boston, Chicago, Cleveland, Dayton, Detroit, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Providence, Rochester.

Another insight into the full meaning of: **"Brass made Bristol-Fashion"**

GREATER *Flexibility*

A Big Advantage of JOHNSON BAND SAWS

The adaptability and flexibility of Johnson Band Saws in handling all types of cutting is almost unlimited. Rods, tubes, angles, heavy rounds or flats and irregular shapes all can be cut quickly and economically . . . Model B Saw, pictured, offers the high speed and accuracy of a much larger machine. Capacity, 5″ rounds and 10″ flats; makes a handy saw for large or small shops; with or without casters. Also, Model J, for 10″ rounds, 18″ flats.

Write for catalog.

JOHNSON MANUFACTURING CORP.
ALBION, MICHIGAN

STEEL
SCRAP IS VITAL
TO OUR DEFENSE PROGRAM

BE SURE YOUR COMPANY TURNS IN ALL AVAILABLE SCRAP STEEL PROMPTLY

Look around your plant for hidden Scrap . . . keep it flowing

WYCKOFF ★ **STEEL COMPANY**

production ideas

Continued

oratory preliminaries. The test may be applied to any non-austenitic molten steel up to 0.60 pct carbon. *Harry W. Dietert Co.*

For more data insert No. 42 on postcard, p. 37.

Speed Truck

For safe, fast, material handling.

The Model 2500 speed truck can carry a heavy load because of its rugged construction. A two-cylinder 13 hp air cooled Wisconsin engine assures dependable service at

low cost. The truck is highly maneuverable, with three speeds forward and one reverse, rigid shoe-type internal expanding brakes, Timken-equipped steering fork and pneumatic or U. S. Innacush tires. Its wheel turning radius is 64 in.; deck loading area 20 sq ft with space beside driver's seat for long material. *Kalamazoo Mfg. Co.*

For more data insert No. 43 on postcard, p. 37.

Dial Groove Gage

Interchangeable extension arms cover smallest to largest sizes.

The dial groove gage is a self-positioning precision instrument that provides positive control in checking diameters of internal

grooves and recesses, Truarc and O rings, oil grooves, etc. Range settings are made with a simple knurled vernier nut adjustment. Settings can be made direct to the gage block combinations or on a mi-

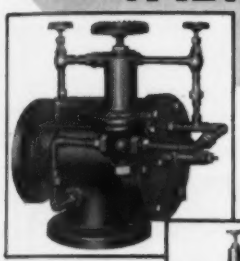
3 Good Ways to Insure

★ Longer Service

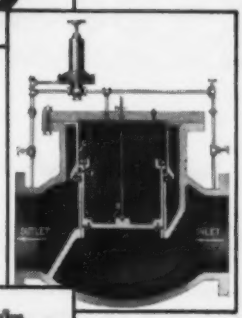
★ Minimum Maintenance

★ Greater Dependability

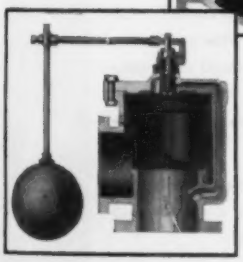
Install GOLDEN-ANDERSON "Cushioned" VALVES



G-A Surge Relief Valve. Bulletin W-2 sent on request.



G-A Water Pressure Reducing Valve. Bulletin W-3 contains the technical information you want.



G-A Cold Water Float Valve. Bulletin W-5 will be of interest to you.

The patented air and water double cushioning feature inherent in all G-A Valves prevents any slam or hammer.

Let our reputable engineers help you with your water control problems.

GOLDEN ANDERSON Valve Specialty Company

2096 KEENAN BUILDING PITTSBURGH 22, PA.

production ideas

Continued

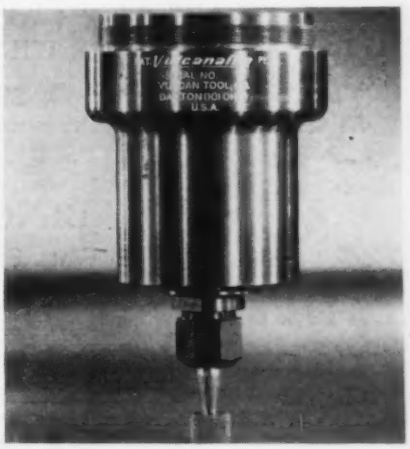
crometer. The gage can be used by skilled and unskilled personnel. *Nilsson Gage Co.*

For more data insert No. 44 on postcard, p. 37.

Precision Spindles

Employ infinitely controlled high speed air-operated, cooled motors.

Only 3 5/16 in. long, the new Vulcanaire precision spindles can be adapted to practically any machine for high precision production, finishing contours on hardened steel working surfaces for cams, fingers,



or levers, burring or milling die castings, routing wood contours, carbide milling or finishing slots. With room temperature air and oil continually circulating through the grinder, heat and expansion are controlled. All parts of the Vulcanaire are made of alloy steel, machined and ground with extreme care to maintain perfect balance. *Vulcan Tool Co.*

For more data insert No. 45 on postcard, p. 37.

Auxiliary Lift Attachment

Can add 5 ft to fork truck's max lift; converts lost space to profitable area.

The auxiliary attachment is available for standard fork trucks made by Automatic and is of greatest value where ceiling height and the nature of the loads leave several empty feet under the ceiling. Overall height of the truck, which is 83 in., is not increased by the device. The unit has its own high pressure hydraulic rams, pump, and motor, and is operated by a simple pushbutton control. *Automatic Transportation Co.*

For more data insert No. 46 on postcard, p. 37.

Resume Your Reading on Page 41

PAGE WIRE

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HIGH CARBON
STAINLESS
SPECIAL ALLOY
ARMCO IRON

You draw the Shape —Page can draw the Wire

—the way you want it for your production—whether it's ALL of your product, or only a part. Cross-sectional areas up to .250″ square; widths to ⅜″; width-to-thickness ratio not exceeding 6 to 1.

for Wire or Information about Wire—

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COLD ROLLED STRIP STEEL
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For the last half century, Griffin cold rolled strip steel has been used profitably by hundreds of manufacturers. They have found that they can rely on Griffin to fill their specifications to gauge, temper, size, finish, length, and edges.

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Pressure tanks and cylinders, barrels, drums, pails.

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Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction.

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IRON AGE *markets and prices*

market briefs and bulletins

boron containing steels—Production of new boron steels developed to conserve manganese, nickel, chromium and molybdenum, has been undertaken by: U. S. Steel Co., Bethlehem Steel Co., Youngstown Sheet & Tube Co., Crucible Steel Co. of America, Wisconsin Steel Co., Republic Steel Corp., Copperweld Steel Co., and Rotary Electric Steel Co. The 80Bxx steels are designed to have hardenability equivalent to the 86xx steel; 81Bxx compares with 41xx steels; 94B17 is equivalent to 4832.

coke outlook—February was a bad month for foundry coke in the East; the rail strike and cold weather contributed to an already poor situation. As the weather improves, the coke situation will improve. The coming of natural gas to New York will help and may even cause a surplus of some coke grades. The foundry coke outlook, however, is one of very tight supply for the remainder of 1951.

military orders—More than 35 pct of Westinghouse Electric Corp's unfilled orders at the close of 1950 were for military requirements. The company's annual report to stockholders disclosed it is producing radar-directed, rocket-firing devices, and working on improved turbo-jet engines and development of an atomic power plant for submarine propulsion.

signs of the times—Western steel users are having increasing difficulty getting materials, and one fabricator is welding 12-in. strips together to obtain the 24-in. sheets. An aluminum fabricator, jobbing out work to a shop with more flexible operations, has an aluminum surplus. Fabricators generally expect a lag between the time materials are curtailed and government defense orders are forthcoming.

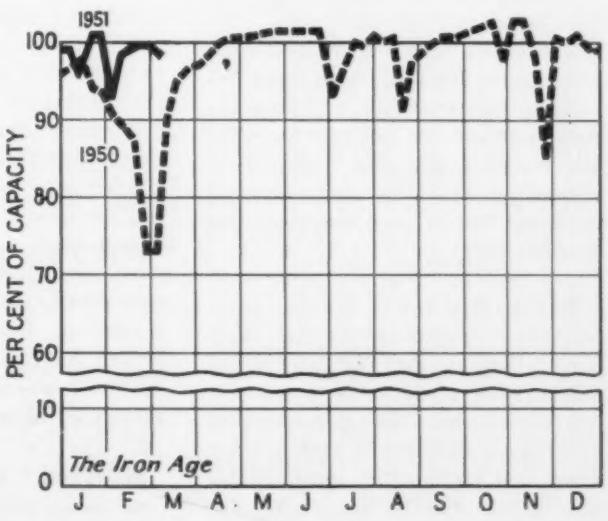
foundry iron—The current high steel rate is cutting deeply into pig iron availability. Merchant iron is extremely scarce. Some foundries normally using 40 pct pig in their charges are reported using only 10 pct today. Shortage of foundry grades of cast scrap in the East is making the situation doubly difficult.

permanent magnet shortage ahead—Spot to watch from April on is permanent magnets made of Alnico. One firm reports it will go out of business when the cut is made and it can no longer make high fidelity speakers. In car radios the cut will be important, since electrodynamic speakers that will be used instead, drain about an amp of current out of a battery—a large drain when the engine isn't running.

pipe & tubing—Producers of pipe and tubular products are channeling an ever increasing amount of their products into defense orders, allocation programs and directives. One large producer says that 60 pct of their output of finished goods are currently going to these sources.

fabricated steel—Philadelphia area fabricators are well booked at present despite the fact that there is not much new business coming to them. If a slack period develops, it is expected that DO work will relieve it. Many rumors are heard of new industrial expansions.

Steel Operations**



District Operating Rates—Per Cent of Capacity**

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Feb. 25.....	99.0*	103.5*	99.0	99.0	102.3	104.0	99.0	107.0*	99.0	104.0	86.0	87.2	112.6	100.0
Mar. 4.....	98.0	104.0	93.0	99.0	103.0	104.0	97.5	106.0	100.0	53.0	93.5	95.1	92.0	96.0

* Revised.
** Beginning Jan. 1, 1951, operations are based on an annual capacity of 104,229,650 net tons.

nonferrous metals

outlook and market activities

NONFERROUS METALS PRICES

	Feb. 28	Mar. 1	Mar. 2	Mar. 3	Mar. 5	Mar. 6
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.815	$1.815	$1.8175	....	$1.795	$1.715*
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	16.80	16.80	16.80	16.80	16.80	16.80

Note: Quotations are going prices.

*Tentative.

by R.Hatschek

Tin Recommendation — Senator Lyndon Johnson's preparedness subcommittee this week suggested that the government stop buying tin for the national stockpile. It was pointed out in the report that the U. S. stockpile is now greater than it was on Dec. 7, 1941 and that the price has soared fantastically since the start of the Korean war.

The added cost to the taxpayers was stressed and tin mine producers were accused of curtailing production for their own ends despite world conditions. The committee called for an international tin meeting for the purpose of allocating available supplies and bringing the price down to a reasonable level.

RFC to Buy for U. S.—The committee proposed that the New York, London and Singapore tin markets be closed and prices be negotiated between governments allowing a fair profit rather than what the traffic will bear. Plans are under way to make the Reconstruction Finance Corp. the sole buyer in this country for both industry and government stockpile.

The immediate effect of this news was to depress the markets at New York, London and Singapore.

Aluminum DO's Increase—Demand for secondary aluminum ingot is at a high level and supplies are fair, though they could be better. Following the slight dip in business after the aluminum cutback, ingot makers now report an ever-increasing flow of DO rated orders on the metal.

Brass Ingot Squeeze — Secondary brass ingot makers are caught between high demand on one side and bad raw material supplies on the other. Some are now taking orders subject to the availability of scrap metals. High scrap prices, up to 29¢ per lb for No. 1 copper, are putting some in the red for new business. Government action on a price list for nonferrous scrap would help but nobody can predict when the action will be taken. Dealers' scrap buying prices have also been forced up by the high competition to levels almost equal to December '50.

MONTHLY AVERAGE PRICES

The average prices of the major non-ferrous metals in February based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley	24.50
Lake copper, delivered	24.625
Straits tin, New York	$1.8268
Zinc, East St. Louis	17.50
Zinc, New York	18.22
Lead, St. Louis	16.80
Lead, New York	17.00

Northwest Aluminum Okayed—Aluminum Co. of America plans to build a new plant in the Wenatchee, Wash., area were given the nod by Secretary of the Interior Oscar L. Chapman. The plant is seen as a precedent-setter for future tapping of water power resources. Mr. Chapman indicated that in the planning of defense expansion the average or probable water conditions will be used to calculate the available power resource.

Power will come from the Rock Island Dam and the Federal power system. The plant is expected to be completed by late 1952 and its annual capacity will be in the neighborhood of 150 million lb of aluminum.

Copper Solution? — C. Donald Dallas, board chairman of Revere Copper & Brass, made these recommendations to alleviate the copper shortage: (1) Increase Chilean production; (2) abolish the copper import tariff; (3) stabilize the dollar; (4) arrange priorities for export to Chile of copper-producing machinery; (5) boost the price to about 28¢ per lb; (6) immediately clamp a lid on scrap copper prices; and (7) completely suspend government copper stockpiling to permit a revived flow of supplies.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate: ¼ in. and heavier: 2S, 3S-F, 28.3¢ 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 38.5¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅝ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4; 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-T5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.142; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.024 in. x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb.; 0.024 in. x 28 in., 26.9¢ per lb.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in. 63¢; 3/16 in. 65¢; ⅛ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ⅓ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2⅛ to 5 in., 48.5¢. Other alloys higher. Base: Up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅝, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.; Up to 1½ in., 10,000 lb; 1¼ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheet and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	71½	57
Strip, cold-rolled	77½	60
Rods and bars	67½	55
Angles, hot-rolled	67½	55
Plates	69½	56
Seamless tubes	100½	90
Shot and blocks	....	50

Copper, Brass, Bronze

(Freight prepaid on 200 lb includes duty)

	Sheets	Rods	Extruded Shapes
Copper	41.03	....	40.63
Copper, h-r	....	36.88	....
Copper, drawn	....	38.18	....
Low brass	39.15	38.34	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.08	38.61	38.07
Leaded brass	....	32.63	36.70
Com'l bronze	41.13	40.82	....
Mang. bronze	45.96	40.65	41.41
Phos. bronze	60.20	60.45	....
Muntz metal	40.43	36.74	37.99
Ni silver, 10 pct	49.27	51.49	....
Arch. bronze	....	....	35.11

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	42.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.10 to $2.17
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	16.80
Lead, New York	17.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$216-$220
Nickel, electro, f.o.b. New York	53.55
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	46.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	90.16
Tin, New York	$1.715
Titanium, sponge	$5.00
Zinc, East St. Louis	17.50
Zinc, New York	18.22
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	29.00
No. 120	28.50
No. 123	28.00
80-10-10 ingot	
No. 305	35.00
No. 315	32.00
88-10-2 ingot	
No. 210	46.25
No. 215	43.25
No. 245	36.00
Yellow ingot	
No. 405	25.00
Manganese bronze	
No. 421	29.75

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum-silicon alloys	
0.30 copper, max.	33.25-34.25
0.60 copper, max.	33.00-34.00
Piston alloys (No. 122 type)	30.50-31.00
No. 12 alum. (No. 2 grade)	30.00-30.50
108 alloy	30.25-30.75
195 alloy	31.25-31.75
13 alloy	33.50-34.00
ASX-679	30.50-31.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	32.00-32.50
Grade 2—92-95%	30.25-30.75
Grade 3—90-92%	29.25-29.75
Grade 4—85-90%	28.75-29.25

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39⅛
Electrodeposited	33⅜
Rolled, oval, straight, delivered	38⅞
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	70.50
Rolled, depolarized	71.50
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	52.15
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver syanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drums	45.85

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ⅛¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	23	22¼
Yellow Brass	20½	18¾
Red brass	21½	20¾
Comm. bronze	21¾	21
Mang. bronze	19½	18⅝
Brass rod ends	19⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	21.50
No. 2 copper wire	20.00
Light copper	19.00
Refinery brass	19.50*
Radiators	15.00

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	28.00-29.00
No. 2 copper wire	25.00-26.00
Light copper	22.00
No. 1 composition	24.00-24.50
No. 1 comp. turnings	23.50-24.00
Rolled brass	19.00
Brass pipe	20.50
Radiators	18.50-19.00
Heavy yellow brass	18.50-19.00

Aluminum

Mixed old cast	18½—19
Mixed new clips	20½
Mixed turnings, dry	18½
Pots and pans	18½—19
Low copper	21½—22

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	23
No. 2 heavy copper and wire	22
Light copper	20
New type shell cuttings	20
Auto radiators (unsweated)	16 —17
No. 1 composition	19½—20
No. 1 composition turnings	18½—19
Clean red car boxes	17½—18
Cocks and faucets	17½—18
Mixed heavy yellow brass	15 —16
Old rolled brass	17 —17½
Brass pipe	18½—19
New soft brass clippings	17½—18
Brass rod ends	16½—17
No. 1 brass rod turnings	16 —16½

Aluminum

Alum. pistons and struts	12 —13
Aluminum crankcases	15 —16
2S aluminum clippings	18½—19½
Old sheet and utensils	15 —16
Borings and turnings	12½—13
Misc. cast aluminum	15 —16
Dural clips (24S)	15 —16

Zinc

New zinc clippings	16 —17
Old zinc	11 —12
Zinc routings	8½— 9
Old die cast scrap	8 — 8½

Nickel and Monel

Pure nickel clippings	90 —100
Clean nickel turnings	80 —90
Nickel anodes	90 —100
Nickel rod ends	90 —100
New Monel clippings	30 —35
Clean Monel turnings	20 —25
Old sheet Monel	25 —30
Inconel clippings	30 —35
Nickel silver clippings, mixed	16 —18
Nickel silver turnings, mixed	15 —16

Lead

Soft scrap, lead	15¼—15¾
Battery plates (dry)	9 — 9½

Magnesium

Segregated solids	9 —10
Castings	5½— 6½

Miscellaneous

Block tin	120 —125
No. 1 pewter	80 —85
No. 1 auto babbitt	75 —80
Mixed common babbitt	12¼—12½
Solder joints	23 —24
Siphon tops	75 —80
Small foundry type	18¼—18½
Monotype	16¾—17
Lino. and stereotype	16½—16¾
Electrotype	15 —15½
Hand picked type shells	11½—11¾
Lino. and stereo. dross	8¾— 9
Electro. dross	6¾— 7

SCRAP *iron and steel*

markets
prices
trends

Fear "worst shortage" for Cleveland-Valley district . . . Pressure grows for allocation . . . Mill stockpiles scrap for new openhearths.

Cleveland sources fear stubbornly slow scrap shipments that sap mill stocks may lead to "the worst scrap shortage in the history of the Cleveland-Valley district." That the pinch was on in other areas was demonstrated by increased pressure for allocations of scrap. Although allocations can insure equitable distribution of the available supply and perhaps stimulate some slow sources, the program cannot be expected to uncover a bonanza to lick the shortage.

Some Cleveland foundries are down to 2 days' melt and a possible reason is that automotive scrap is being allocated to consumers who ordinarily did not use it.

Numerous amendments to the order were expected out of Washington this week. Motivated by the shortage some mills may be tempted to pay the price and go deeper into remote areas for scrap. This symptom of scarcity will promote allocations. One mill in Pittsburgh is stockpiling scrap for 11 openhearths now being installed.

Some in the industry, looking to the future, are wondering just how a scrap supply that can barely support today's high melt will be able to meet expanded demands of the future.

Washington ruled that drop broken machinery cast may not be used for openhearths. Reason: naturally, a shortage.

PITTSBURGH—Pressure for scrap allocations is growing. Some mills are being pinched for material, and the indications are virtually all scrap will be allocated before long to assure equitable distribution. Supplies are tight now, and with new steelmaking capacity coming in, the outlook is not bright. Some mills are complaining about the poor quality of dealer scrap. Intensifying the scramble for scrap here is the fact that one mill has begun to stockpile scrap for 11 new openhearths now under construction. One third of this capacity is scheduled to begin producing in August, the remainder by next January. It is estimated 50,000 to 55,000 tons of scrap will be needed monthly for these furnaces.

CHICAGO — Mills in the area need scrap and are dipping into inventories. Some are buying all the unprepared heavy melting steel they can lay their hands on. Direct mill dealing with industries for scrap is increasing. Some government allocation of industrial scrap has taken place but the amount so far is insignificant. It is expected to increase. Dealers are having a hard time picking up scrap and profit margins are being cut down to get scrap into the yards. Black sheet clippings are bringing top prices. Hard-hit foundries are reaching into the South, Southwest and West to bring in foundry grades.

PHILADELPHIA — Reports of overgrading are heard frequently in the trade here. It is said that No. 2 heavy melting has been pegged at everything from No. 1 to foundry steel. Some dealers are holding back No. 2 because they don't like to sell below their competitors and some feel that the OPS will soon set a single ceiling for all grades of openhearth scrap.

NEW YORK—Scrap is oozing along at about the same pace as last week as mill stocks still stayed sick. Not much scrap is available to dealers. Scrap sources hard-hit by pre-control buying will take some time to renew themselves. Dealers' yards are not expected to become as full as before but a balance should be reached to insure a steady supply.

DETROIT—Scrap movements are slow here but any resistance to the new scrap prices seems to be substantially reduced. Most of the restriction in scrap flow is believed to have resulted more from adverse weather than to dealers' refusal to sell scrap. There is still no official clarification of the water rate clause in the Washington order but confusion arising from this situation seems to be subsiding. Most local dealers look for a long-time shortage of scrap metal and pressures to bring out the scrap are expected to rise all along the line as more defense work is piled on top of high civilian output.

CLEVELAND—A new industrial whodunit, where's the scrap, was baffling consumers and trade alike as one of the worst scrap shortages in the history of the Cleveland-Valley district began to shape up this week. Shipments are off and most consumers are working on inventory and calling for allocations. Foundries are hungry, very few have 30 days' supply, and some are down to 2 days' melt. One possible answer is that automotive scrap is being allocated among some consumers who received none ordinarily.

ST. LOUIS—Shipments of scrap iron to consumers in the St. Louis area have slowed somewhat. Weather conditions—too cold to handle material or too muddy to ship by truck—are primarily to blame. With prices fixed by ceilings there is little incentive to speed up the movement. All railroad supplies are being allocated from Washington.

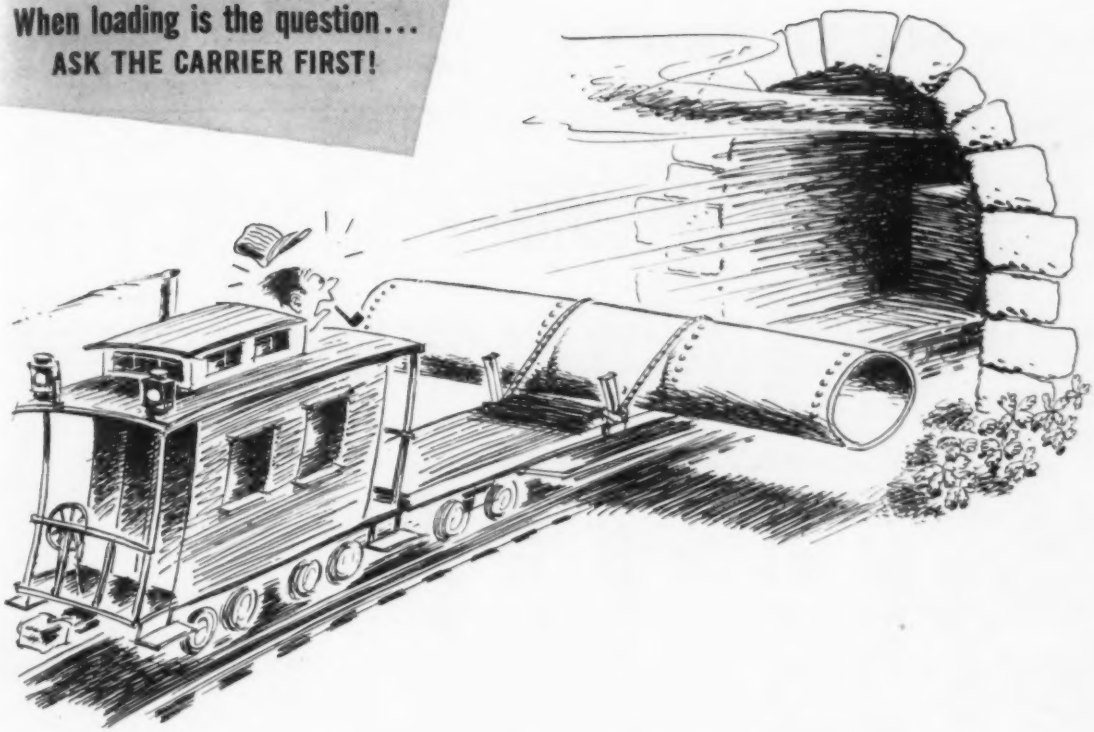
BIRMINGHAM — Movement of scrap into the district is picking up and mills and foundries now are able to get practically everything they want. Much of it still is moving north, however.

CINCINNATI — Only limited tonnages are moving in a strong and demanding market here. Dealers are selling slowly and the shortage of empty cars is also a factor in the limited movement. Consumers are short. One mill is down to a reported 8 days' supply on the ground, a few foundries have been allocated steel, and foundries generally are in need of tonnage.

BOSTON — Trading remained fairly active in the local scrap market here during the past week. Scrap flowed smoothly through dealers' hands with all items moving at ceiling price with the exception of unstripped motor blocks, again reported at $38 to $39.

BUFFALO—With dealers saying that they're satisfied with control prices, sales for about 50,000 tons of steelmaking items have been placed by top mill consumers here. Sales might have been bigger but have been curbed by short supplies. Mills are still hitting inventory. Cast movement is negligible considering brisk demand.

When loading is the question...
ASK THE CARRIER FIRST!



when stainless is the question

ask KLAFF first

BUYERS of STAINLESS SCRAP
STRAIGHT CHROMES, NICHROME, PURE
NICKEL, NICKEL ALLOYS AND INCONEL

H. KLAFF & COMPANY, INC.
BROKERS, CONVERTERS AND DEALERS
Ostend & Paca Sts., Baltimore 30, Md.

50 Years of Service

Iron and Steel SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS, effective Feb. 7, 1951. Shipping point and delivered prices calculated as shown below.)

Switching Charge (Dollars per gross ton) →	$0.99	.75	.53	.68	.75	.51	.75	.75	.51	.51	.76	.63	.65	.26	1.34	.79	.50	.20	.51	.51	.20	.52	.47	.51	.51	.51	.95	.50	.78	.50	.43	.51	.33	.57	.66	.85	.82	.59
Basing Points →	Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monessen	Sharon	Youngstown	Canton	Steubenville	Warren	Weirton	Cleveland	Buffalo	Cincinnati	Middletown	Chicago	Claymont	Coatesville	Conshohocken	Harrisburg	Phoenixville	Sparrows Pt.	Bethlehem	Ashland, Ky.	Kokomo, Ind.	Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham	Alabama City	Atlanta	Minneapolis	Houston	Los Angeles	Pittsburg, Cal.	Portland, Ore.	San Francisco	Seattle
GRADES **OPS No.**																																						
No. 1 heavy melting 1	$44.00							$44.00					$43.00				$42.50						$42.00					$41.00	$40.00		$39.50	$39.00		$38.00	$37.00		$35.00	
No. 2 heavy melting 2	42.00							42.00					41.00				40.50						40.00					39.00	38.00		37.50	37.00		36.00	35.00		33.00	
No. 1 busheling 3	44.00							44.00					43.00				42.50						42.00					41.00	40.00		39.50	39.00		38.00	37.00		35.00	
No. 1 bundles 4	44.00							44.00					43.00				42.50						42.00					41.00	40.00		39.50	39.00		38.00	37.00		35.00	
No. 2 bundles 5	41.00							41.00					40.00				39.50						39.00					38.00	37.00		36.50	36.00		35.00	34.00		32.00	
Machine shop turnings 6	34.00							34.00					33.00				32.50						32.00					31.00	30.00		29.50	29.00		28.00	27.00		25.00	
Mixed borings and turnings 7	38.00							38.00					37.00				36.50						36.00					35.00	34.00		33.50	33.00		32.00	31.00		29.00	
Shovelling turnings 8	38.00							38.00					37.00				36.50						36.00					35.00	34.00		33.50	33.00		32.00	31.00		29.00	
Cast iron borings 10	38.00							38.00					37.00				36.50						36.00					35.00	34.00		33.50	33.00		32.00	31.00		29.00	
No. 1 chemical borings 26	41.00							41.00					40.00				39.50						39.00					38.00	37.00		36.50	36.00		35.00	34.00		32.00	
Forge crops 11	51.50							51.50					50.50				50.00						49.50					48.50	47.50		47.00	46.50		45.50	44.50		42.50	
Bar crops and plate 12	49.00							49.00					48.00				47.50						47.00					46.00	45.00		44.50	44.00		43.00	42.00		40.00	
Punchings and plate 14	46.50							46.50					45.50				45.00						44.50					43.50	42.50		42.00	41.50		40.50	39.50		37.50	
Electric furnace bundles 15	46.00							46.00					45.00				44.50						44.00					43.00	42.00		41.50	41.00		40.00	39.00		37.00	
Cut struct., plate, 3 ft and less 16	47.00							47.00					46.00				45.50						45.00					44.00	43.00		42.50	42.00		41.00	40.00		38.00	
Cut struct., plate, 2 ft and less 17	49.00							49.00					48.00				47.50						47.00					46.00	45.00		44.50	44.00		43.00	42.00		40.00	
Cut struct., plate, 1 ft and less 18	50.00							50.00					49.00				48.50						48.00					47.00	46.00		45.50	45.00		44.00	43.00		41.00	
Foundry steel, 2 ft and less 20	46.00							46.00					45.00				44.50						44.00					43.00	42.00		41.50	41.00		40.00	39.00		37.00	
Foundry steel, 1 ft and less 21	48.00							48.00					47.00				46.50						46.00					45.00	44.00		43.50	43.00		42.00	41.00		39.00	
Heavy turnings 24	43.00							43.00					42.00				41.50						41.00					40.00	39.00		38.50	38.00		37.00	36.00		34.00	
No. 1 RR heavy melting RR 1	46.00							46.00					45.00				44.50						44.00					43.00	42.00		41.50	41.00		40.00	39.00		37.00	
Scrap rails, random lengths RR 14	48.00							48.00					47.00				46.50						46.00					45.00	44.00		43.50	43.00		42.00	41.00		39.00	
Scrap rails, 3 ft and less RR 16	51.00							51.00					50.00				49.50						49.00					48.00	47.00		46.50	46.00		45.00	44.00		42.00	
Scrap rails, 2 ft and less RR 17	52.00							52.00					51.00				50.50						50.00					49.00	48.00		47.50	47.00		46.00	45.00		43.00	
Scrap rails, 18 in. and less RR 18	54.00							54.00					53.00				52.50						52.00					51.00	50.00		49.50	49.00		48.00	47.00		45.00	
Rerolling rails RR 15	53.00							53.00					52.00				51.50						51.00					50.00	49.00		48.50	48.00		47.00	46.00		44.00	
Uncut tires RR 20	48.00							48.00					47.00				46.50						46.00					45.00	44.00		43.50	43.00		42.00	41.00		39.00	
Cut tires RR 21	51.00							51.00					50.00				49.50						49.00					48.00	47.00		46.50	46.00		45.00	44.00		42.00	
Cut bolsters and side frames RR 23	49.00							49.00					48.00				47.50						47.00					46.00	45.00		44.50	44.00		43.00	42.00		40.00	
RR specialties RR 24, 28, 29	51.00							51.00					50.00				49.50						49.00					48.00	47.00		46.50	46.00		45.00	44.00		42.00	
Solid steel axles RR 25	58.00							58.00					57.00				56.50						56.00					55.00	54.00		53.50	53.00		52.00	51.00		49.00	
No. 3 steel wheels RR 27	51.00							51.00					50.00				49.50						49.00					48.00	47.00		46.50	46.00		45.00	44.00		42.00	

Cast Scrap

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y. cast	11	52.00

Boston, unstripped motor blocks....$38 to $39

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh; Bessemer, Homestead, Duquesne, Munhall. Cincinnati; Newport. St. Louis; Granite City, East St. Louis, Madison. San Francisco; South San Francisco, Niles, Oakland. Claymont; Chester. Chicago; Gary. Los Angeles; Firestone.

SHIPPING POINT PRICES (Except RR scrap)—For shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is $1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, $1.50, and New England ports, $1.75. Maximum shipping point price on No. 1 heavy melting steel in New York City is $36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Ceiling need not fall below $32 per gross ton for No. 1 heavy melting steel, with set differentials for other grades. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (RR scrap)—Ceiling on-line price of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point, non-operating RR's, and RR scrap sold by someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 137-C.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

UNPREPARED SCRAP—Ceiling price is $8 a ton less than prepared base grades (No. 1 heavy & No. 1 RR heavy). Scrap suitable for compressing into No. 1 bundles is $6 less than No. 1 bundles; suitable for compressing into No. 2 bundles, $8 less than No. 2 bundles. For cast material requiring special preparation, price is breakable cast less preparation costs.

COMMISSIONS—Brokers are permitted a maximum of $1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—These alloy extras are permitted: **Nickel**; $1.25 may be added to price of No. 1 heavy for each 0.25 pct nickel between 1 and 5.25 pct. **Molybdenum**; $2 may be added to price of No. 1 heavy for molybdenum over 0.15 pct, $3 for content over 0.65 pct. **Manganese**; $4 may be added to price of No. 1 heavy or No. 1 RR heavy for content over 10 pct if scrap is in sizes over 8 x 12 x 24 in., $14 if less than 8 x 12 x 24 in. Manganese premium applicable only if sold for electric furnace use or on NPA allocation. **Silicon**; electric furnace and foundry grade adjustments are not applicable if silicon content is between 0.5 and 1.75 pct. **Chromium**; $1 may be added if scrap conforms to SAE 52100 analysis and is to be used in an electric furnace. In no case is price to exceed No. 1 heavy by more than $1. **Multiple Alloys**; if scrap contains two premium alloy elements, total premium may not exceed ceiling premium for any one contained alloy.

RESTRICTIONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. For example, the price established for Grade 28 (wrought iron) may be charged only when sold to a producer of wrought iron. Otherwise the ceiling price shall not exceed the ceiling price for the corresponding grade of basic openhearth. Restrictions on use are placed on the following grades: Chemical borings, wrought iron and rerolling rails. Ceiling prices on billet bloom and forge crops, alloy-free turnings, and heavy turnings may be charged only when shipped directly from industrial producer. NPA prohibits openhearth users from buying electric furnace grades, Nos. 11 through 18, foundry grades, Nos. 20 and 21 and cast grades, 1, 7, 9 and 11.

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	$ 8.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	3.00
Bar crops and plate; punchings and plate; structural and plate, 1 ft & less, and 3 ft and less; foundry steel, 1 ft & less and 2 ft & less; wrought iron	10.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00

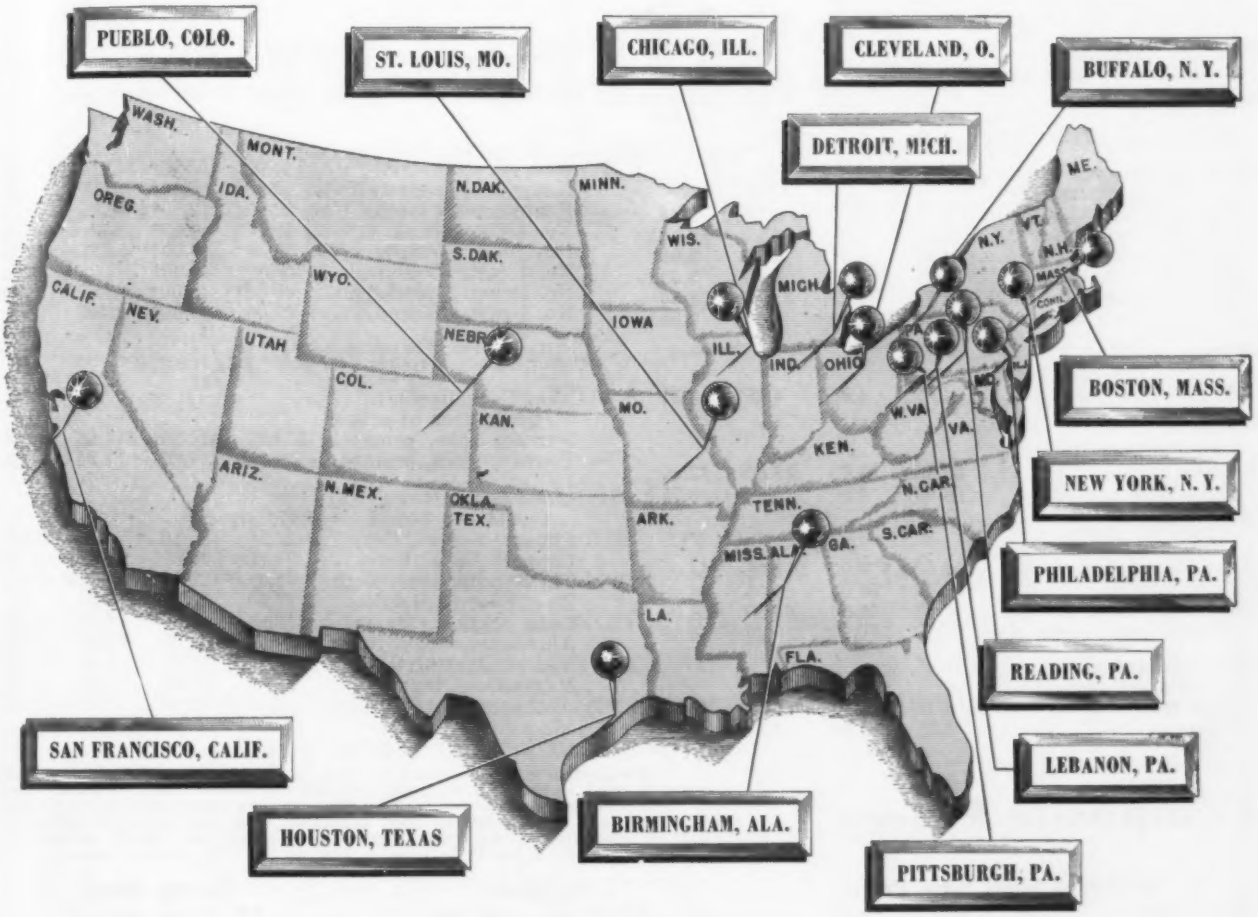
Hamilton, Ontario

(Consumers buying prices, del'd gross ton)

Hvy. melting steel	$30.00
No. 1 bundles	30.00
No. 2 bundles	29.50
Mechanical bundles	28.00
Mixed, steel scrap	26.00
Rails, remelting	30.00
Rails, rerolling	33.00
Bushelings	24.50
Bushelings, prepared new factory	28.00
Bushelings, unprepared new factory	27.00
Short steel turnings	23.00
Mixed borings, turnings	23.00
Cast scrap	48.00 to 50.00

For the Purchase or Sale of Iron and Steel Scrap . . .

CONSULT OUR NEAREST OFFICE



The energy and integrity of our organization is ready to serve your best interests . . . Since 1889, Luria Brothers & Company, Inc. have made fair dealings their constant aim.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices in this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Mar. 6, 1951	Feb. 27, 1951	Feb. 6. 1951	Mar. 7 1950
Hot-rolled sheets	3.60	3.60	3.60	3.35
Cold-rolled sheets	4.35	4.35	4.35	4.10
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.40
Hot-rolled strip	3.50	3.50	3.50	3.25
Cold-rolled strip	4.75	4.75	4.75	4.21
Plate	3.70	3.70	3.70	3.50
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R-strip (No. 302)	36.50	36.50	36.50	33.00
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$7.50	$7.50	$7.50	$7.50
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.60
Special coated mfg. ternes	6.35	6.35	6.35	6.50
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.45
Cold finished bars	4.55	4.55	4.55	*4.145
Alloy bars	4.30	4.30	4.30	3.95
Structural shapes	3.65	3.65	3.65	3.40
Stainless bars (No. 302)	31.25	31.25	31.25	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.85	4.85	4.85	4.50
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.40
Light rails	4.00	4.00	4.00	3.75
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$54.00
Slabs, rerolling	56.00	56.00	56.00	54.00
Forging billets	66.00	66.00	66.00	63.00
Alloy blooms billets, slabs	70.00	70.00	70.00	66.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	3.85
Skelp	3.35	3.35	3.35	3.15

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*

Pig Iron: (per gross ton)	Mar. 6, 1951	Feb. 27, 1951	Feb. 6. 1951	Mar. 7 1950
No. 2 foundry, del'd Phila.	$57.77	$57.77	$57.77	$50.42
No. 2, Valley furnace	52.50	52.50	52.50	46.50
No. 2, Southern Cin'ti	55.58	55.58	55.58	49.08
No. 2, Birmingham	48.88	48.88	48.88	42.38
No. 2, foundry, Chicago†	52.50	52.50	52.50	46.50
Basic del'd Philadelphia	56.92	56.92	56.92	49.92
Basic, Valley furnace	52.00	52.00	52.00	46.00
Malleable, Chicago†	52.50	52.50	52.50	46.50
Malleable, Valley	52.50	52.50	52.50	46.50
Charcoal, Chicago	70.56	70.56	70.56	68.56
Ferromanganese‡	186.25	186.25	186.25	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$44.00*	$44.00*	$51.13	$31.75
Heavy melt'g steel, Phila.	42.50*	42.50*	47.50	23.00
Heavy melt'g steel, Ch'go	42.50*	42.50*	44.63	27.50
No. 1 hy. com. sh't, Det.	40.00*	40.00*	40.25	22.50
Low phos. Young'n	46.50*	46.50*	54.50	32.75
No. 1 cast, Pittsburgh	49.00†	49.00†	67.75	37.50
No. 1 cast, Philadelphia	49.00†	49.00†	62.50	35.50
No. 1 cast, Chicago	49.00†	49.00†	63.00	39.50

*Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.00
Foundry coke, prompt	17.25	17.25	17.25	15.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	18.50
Copper, Lake, Conn.	24.625	24.625	24.625	18.625
Tin Straits, New York	*$1.715*†	$1.82⅝	$1.825	74.50
Zinc, East St Louis	17.50	17.50	17.50	9.75
Lead, St. Louis	16.80	16.80	16.80	11.80
Aluminum, virgin	19.00	19.00	19.00	17.00
Nickel, electrolytic	53.55	53.55	53.55	42.97
Magnesium, ingot	24.50	24.50	24.50	20.50
Antimony, Laredo, Tex.	42.00	42.00	42.00	24.50

† Tentative. * Revised.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Mar. 6, 1951	4.131¢ per lb	$52.69 per gross ton	$43.00 per gross ton
One week ago	4.131¢ per lb	52.69 per gross ton	43.00 per gross ton
One month ago	4.131¢ per lb	52.69 per gross ton	47.75 per gross ton
One year ago	3.837¢ per lb	46.38 per gross ton	27.42 per gross ton

	Finished Steel Base Price High	Finished Steel Base Price Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1951	4.131¢ Jan. 2	4.131¢ Jan. 2	$52.69 Jan. 2	$52.69 Jan. 2	$47.75 Jan. 30	$43.00 Feb. 7
1950	4.131¢ Dec. 1	3.837¢ Jan. 3	52.69 Dec. 12	45.88 Jan. 3	45.13 Dec. 19	26.25 Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1838	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1932	1.89196¢ July 5	1.83910¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Molybdenum re-enlists

As in World War II, the needs of our Government for defense are so large as to require a control over the uses of Molybdenum. Molybdenum distribution and inventory have been put under control by the National Production Authority, thus directing the available supply into proper channels.

In this rapidly expanding alloy age, a shortage of all alloying elements can be expected during the present crisis.

The Climax Molybdenum Company pledges to continue its labors to increase the availability of Molybdenum at as rapid a pace as possible. In the meantime, our technical staff is at your service to discuss ways of conserving Molybdenum.

Climax Molybdenum Company
500 Fifth Avenue · New York City

IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$52.00[1]													
Alloy, net ton	$54.00[1,17]													$54.00[21]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$56.00[1,8]	$56.00[1]	$56.00[1]						$56.00[3]		$56.00[3]			
Carbon forging billets, net ton	$66.00[1,5]	$66.00[1,4]	$66.00[1]	$66.00[4]	$66.00[4]				$86.00[3,4]	$73.00[26]	$66.00[3]			$69.00[21]
Alloy, net ton	$70.00[1,17,6]	$70.00[1,4,6]	$70.00[1]		$70.00[4]			$70.00[3]	$70.00[3,4]	$77.00[26]	$70.00[3]			$73.00[21]
PIPE SKELP	3.35[1] 3.45[5]						3.35[1,4]							
WIRE RODS	4.10[2] 4.30[18]	4.10[2,4,33]	4.10[5]	4.10[2]			4.10[5]		4.10[53]		4.10[3]	4.20[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60[1,5,9,15] 3.75[28]	3.60[5,23]	3.60[1,5,8]	3.60[4,5]		3.60[7]	3.60[1,4,6] 4.00[13]		3.80[3]	4.00[26]		3.60[3]	4.30[22]	3.80[13] 4.40[47]
Cold-rolled	4.35[1,5,9,15] 5.35[63,7]		4.35[1,6,8]	4.35[4,5]		4.35[7]	4.35[4,6]		4.35[3]			4.35[3]	5.05[22]	4.55[13]
Galvanized (10 gage)	4.80[1,9,15]		4.80[1,8]		4.80[4]	4.80[7]	5.50[44] 6.00[64]					4.80[3]	5.80[22]	
Enameling (12 gage)	4.65[1]		4.65[1,8]	4.65[4]		4.65[7]	4.65[5]						5.35[22]	
Long terne (10 gage)	5.20[9,15]		5.20[1]			5.20[7]	6.00[64]							
Hi str. low alloy, h.r.	5.40[1,5] 5.75[9]	5.40[1]	5.40[1,8] 5.90[6]	5.40[4,5]			5.40[1,4,13] 5.90[6]		5.40[3]	5.65[26]		5.40[3]		5.95[13]
Hi str. low alloy, c.r.	6.55[1,5] 6.90[9]		6.55[1,8] 7.05[6]	6.55[4,5]			6.55[4] 7.05[6]		6.55[3]			6.55[3]		7.10[13]
Hi str. low alloy, galv.	7.20[1]											6.75[3]		
STRIP Hot-rolled	3.60[9], 4.00[41,58], 3.75[28] 3.50[5,7]	3.50[66]	3.50[1,6,8]			3.50[7]	3.50[1,4,6] 4.00[13]		3.50[3,4]	3.90[26]	3.50[3]	3.50[3]		4.40[47] 3.80[13]
Cold-rolled	4.65[5,7,9] 5.00[28] 5.35[40,63,68]	4.90[5,66]	4.90[8]	4.65[2,5]		4.65[7]	4.65[4,5] 5.25[48,49] 5.35[13,49]		4.65[3]			4.65[3]		4.85[13] 5.45[47] 5.80[58,61]
Hi str. low alloy, h.r.	5.75[9]		5.50[1] 5.30[5], 5.80[6]				4.95[4], 5.50[1] 5.40[13] 5.80[6]		4.95[3]	5.55[26]		4.95[3]		5.95[13]
Hi str. low alloy, c.r.	7.20[9]			{6.55[2] {6.70[5]			{6.20[4], 6.55[13] {7.05[6]		6.40[3]			6.40[3]		
TINPLATE† Cokes, 1.25-lb base box (1.50 lb, add 25¢)	$8.45[1,5,9,15]		$8.45[1,6,8]				$8.45[4]					$8.55[3]		
Electrolytic 0.25, 0.50, 0.75 lb box	0.25 lb. base box, $7.15[1,4,5,8,9]; $7.25[3,11]; $7.35[22] 0.50 lb., add 25¢; 0.75 lb. add 65¢													
BLACKPLATE, 29 gage Hollowware enameling	5.85[1] 6.15[15] 6.25[5]		5.85[1]				5.30[4]							
BARS Carbon steel	3.70[1,5] 3.85[9]	3.70[1,4,23]	3.70[1,4,6,8]	3.70[4]	3.70[4]		3.70[1,4,6]		3.70[3,4]		3.70[3]			3.85[21]
Reinforcing‡	3.70[1,5]	3.70[4]	3.70[1,6,8]	3.70[4]			3.70[1,4,6]		3.70[3,4]		3.70[3]	3.70[3]		
Cold-finished	4.55[2,4,5,52,69,71]	4.55[2,69,70,73,73]	4.55[4,74,73]	4.55[3]	4.55[4,63]		4.55[6,57]		4.60[70]					4.70[64]
Alloy, hot-rolled	4.30[1,17]	4.30[1,4,23]	4.30[1,6,8]		4.30[4]		4.30[1,6]	4.30[3]	4.30[3,4]		4.30[3]			4.45[21] 4.65[13]
Alloy, cold-drawn	5.40[17,52,69,71,2]	5.40[4,23,69,70,73] 5.45[2]	5.40[4,73,74]		5.40[4,52,53]		5.40[6,25,57]	5.40[3]	5.40[3]					5.55[64]
Hi str. low alloy, h.r.	5.55[1,5]		5.55[1,8] 6.05[5]	5.55[4,5]			5.55[1] 6.05[6]	5.55[3]	5.55[3]		5.55[3]			
PLATE Carbon steel	3.70[1,5,15] 4.00[9]	3.70[1,23]	3.70[1,6,8]	3.70[4,5] 4.00[9]			3.70[1,4,6] 3.95[13]		3.70[3]	4.15[26]	3.70[3]	3.70[3]	4.40[22]	
Floor plates	4.75[1]	4.75[1]	4.75[8]	4.75[5]						4.75[26]				
Alloy	4.75[1]	4.75[1]	4.75[1]				5.20[13]			5.05[26]	4.75[3]	4.75[3]		
Hi str. low alloy	5.65[1,5]	5.65[1] 6.00[6]	5.65[1,8] 6.15[6]	5.65[4,5]			{5.65[4] {5.70[13] {6.15[6]			5.90[26]	5.65[3]	5.65[3]		
SHAPES, Structural	3.65[1,5] 3.90[9]	3.65[1,23]	3.65[1,8]					3.70[3]	3.70[3]		3.70[3]			
Hi str. low alloy	5.50[1,5]	5.50[1]	5.50[1,8] 6.00[6]				6.00[6]	5.50[3]	5.50[3]		5.50[3]			
MANUFACTURERS' WIRE Bright	4.85[2,5] 5.10[18]	4.85[2] 4,23,33,34		4.85[2]			4.85[6]	Kokomo—4.95[30] 4.85[35]			4.85[3]	4.95[3]	Duluth—4.85[3]	
PILING, Steel Sheet	4.45[1]	4.45[1]	4.45[8]						4.45[3]					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$79.00[19]		INGOTS Carbon forging, net ton
	$82.00[83]		F=$80.00[19]		Alloy, net ton
		$56.00[11]	F=$75.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$74.00[83]	$66.00[11]	F=$85.00[19] SF, LA, S=$85.00[82]	Geneva=$66.00[16]	Carbon forging billets, net ton
	$78.00[83]		F=$89.00[19] LA=$90.00[82]		Alloy net ton
					PIPE SKELP
	4.50[83]	4.10[4,11]	SF=4.90[2], F=4.90[19] LA=4.90[24,62]	Worcester=4.40[2] Minnequa=4.35[14] Portsmouth=4.30[20]	WIRE RODS
		3.60[4,11]	SF, LA=4.30[24] F=4.55[19]	Niles=5.25[64], Geneva=3.70[16] Ashland=3.60[7]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.35[11]	SF=5.30[24] F=5.30[19]		Cold-rolled
		4.80[4,11]	SF, LA=5.55[24]	Ashland=4.80[7] Kokomo=5.20[30]	Galvanized (10 gage)
				Ashland=4.65[7]	Enameling (12 gage)
					Long ternes (10 gage)
		5.40[11]	F=6.35[19]		Hi str. low alloy, h.r.
			F=7.50[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
4.10[83]	4.90[83]	3.50[4,11]	SF, LA=4.25[24,62] F=4.75[19], S=4.50[83]	Atlanta=4.05[65] Minnequa=4.55[14] Ashland=3.50[7]	STRIP Hot-rolled
			F=6.30[19] LA=6.40[97]	New Haven=5.15[3], 5.85[58] Trenton=6.00[48]	Cold-rolled
		5.30[11]	F=6.20[19] SF, LA=6.05[82] S=6.30[82]		Hi str. low alloy, h.r.
			F=6.95[19]		Hi str. low alloy, c.r.
		$8.55[11]	SF=9.20[24]		TINPLATE Cokes, 1.25-lb base box (1.50 lb, add 25¢)
					Electrolytic 0.25, 0.50, 0.75 lb box
		6.35[11]			BLACKPLATE, 29 gage Hollowware enameling
4.30[83]	4.10[83]	3.70[4,11]	SF, LA=4.40[24]	Atlanta=4.25[65] Minnequa=4.15[14]	BARS Carbon steel
4.38[83]	4.10[83]	3.70[4,11]	SF, S=4.45[82] F=4.40[19], LA=4.40[83]	Atlanta=4.25[65] Minnequa=4.50[14]	Reinforcing‡
			LA=6.00[4]	Newark=5.00[69] Putnam=5.10[69] Hartford=5.10[4]	Cold-finished
4.90[83]	4.70[83]		LA=5.35[82] F=5.35[19]		Alloy, hot-rolled
				Newark=5.75[69] Worcester=5.75[2] Hartford=5.85[4]	Alloy, cold-drawn
		5.55[11]	F=6.60[19] SF, S=6.30[82] LA=6.25[62]		Hi str. low alloy, h.r.
	4.10[83]	3.70[4,11]	F=4.30[19] S=4.60[82] Geneva=3.70[16]	Claymont=4.15[39] Coatesville=4.15[21] Minnequa=4.50[14] Geneva=3.70[16]	PLATE Carbon steel
				Harrisburg=5.25[35]	Floor plates
			F=5.70[19] S=6.55[62] Geneva=5.65[16]	Coatesville=5.25[21] Claymont=4.85[39] Geneva=5.65[16]	Alloy
		5.65[11]	F=6.25[19]	Geneva=5.16[16]	Hi str. low alloy
4.25[83]	4.05[83]	3.65[4,11]	SF=4.20[83] F=4.25[16] LA=4.25[24,62] S=4.30[82]	Geneva 3.65[16] Minnequa 4.10[14]	SHAPES, Structural
		5.50[11]	S,F=6.10[82,19] SF=6.00[82] LA=6.05[62]	Geneva=5.50[16]	Hi str. low alloy
5.45[83]	5.25[83]	4.85[4,11]	SF, LA=5.80[24]	Atlanta=5.10[65] Worcester=5.15[2] Minnequa=5.10[14] Portsmouth=5.25[20]	MANUFACTURERS' WIRE Brght

KEY TO STEEL PRODUCERS

1 U. S. Steel Co., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Claymont Steel Corp., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Steel & Wire Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling St. & Carbide Corp., McKeesport
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Fran.
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wycoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville, Ind.
88 National Supply, Pittsburgh, Pa.
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa.
91 Woodward Iron Co., Woodward, Ala.
92 Sloss-Sheffield Steel & Iron Co., Birmingham
93 Hanna Furance Corp., Detroit
94 Interlake Iron Corp., Cleveland
95 Lone Star Steel Co., Dallas
96 Mystic Iron Works, Everett, Mass.
97 Jackson Iron & Steel Co., Jackson, O.
98 Globe Iron Co., Jackson, O.
99 Pittsburgh Coke & Chemical Co., Pittsburgh
100 Shenango Furnace Co., Pittsburgh
101 Tennessee Products & Chem. Corp., Nashville
102 Koppers Co., Inc., Granite City, Ill.
103 Page Steel & Wire Div., American Chain & Cable., Monessen, Pa.
104 Wallingford Steel Co., Wallingford, Conn.

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.00	16.50	16.00	24.25	19.75	21.50	12.75	14.75	13.00
Slabs, billets rerolling	18.50	19.75	21.75	20.75	31.75	26.00	28.25	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.00	36.50	35.50	52.50	40.00	44.50	28.00	28.50	28.50
Billets, forging	26.25	26.25	28.75	27.50	41.00	31.00	34.75	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.25	33.75	32.75	48.75	36.75	41.25	25.75	26.25	26.25
Plates	33.00	33.00	35.00	35.00	51.50	40.50	45.00	27.00	27.50	27.50
Sheets	41.00	41.00	43.00	43.00	56.50	49.00	53.50	36.50	37.00	39.00
Strip, hot-rolled	26.50	26.00	32.25	30.00	48.25	36.75	41.00	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.50	40.00	38.50	58.50	48.00	52.00	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 45.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13; Butler, Pa., 7; Wallingford, Conn., 104.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28; Monessen, 103; Syracuse, N. Y., 17; Bridgeville, Pa., 59.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44; Syracuse, N. Y., 17.

Plates: Brackenridge, Pa., 28 (type 416 add ½¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28; Washington, Pa., 39.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1; Syracuse, N. Y., 17.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer-1	3.60	4.00	4.70					
Chicago-4				6.15				
Ensley-11	3.60	4.00						
Fairfield-11		4.00	4.40			8.60	4.50	
Gary-1	3.60	4.00					4.50	
Ind. Harbor-8	3.60		4.70	6.15	5.25	8.60	4.50	
Johnstown-3		4.00			5.60	8.60		
Joliet-1		4.00	4.70					
Kansas City-63				6.40				9.85
Lackawanna-3	3.60	4.00	4.70			8.60	4.50	
Lebanon-3				6.15				9.85
Minnequa-14	3.60	4.50	4.70	6.15		8.60	4.50	9.85
Pittsburgh-77						9.35		9.85
Pittsburgh-78								9.85
Pittsburgh-5				6.15				
Pittsburg-24							4.65	
Seattle-62				6.10			4.35	
Steelton-3	3.60		4.70				4.50	
Struthers-6				6.15				
Torrance-24							4.65	
Youngstown-4				6.15				

BOILER TUBES

Per 100 ft., cut, 10 to 24 ft.

F.o.b. Mill	Size		Seamless		Elec. Weld	
	Od-in.	B. W. Ga.	H. R.	C.D.	H. R.	C.D.
Babcock & Wilcox	2	13	22.67	26.66	21.99	25.86
	2½	12	30.48	35.84	29.57	34.75
	3	12	33.90	39.90	32.89	38.70
	3½	11	42.37	49.89	41.10	48.39
	4	10	52.60	61.88	51.03	60.02
National Tube	2	13	21.62	26.48		
	2½	12	29.65	36.32		
	3	12	34.00	41.64		
	3½	11	40.34	49.41		
	4	10	51.21	62.72		
Pittsburgh Steel	2	13		27.08		
	2½	12	30.49	37.15		
	3	12	34.95	42.59		
	3½	11	41.48	50.54		
	4	10	56.65	64.16		

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9–15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. (1) ¢/lb.
Alabama City-4	118	126		123		136	5.70	6.15
Aliquippa, Pa.-5	118	132			136	140	5.70	6.15
Atlanta-65	121	133		126	126	143	5.95	6.40
Bartonville-34	118	130	140	123	143	143	5.95	6.15
Buffalo-85							4.85	
Cleveland-86	125							
Cleveland-2							5.70	6.15
Crawfordsville-87		132				145	5.95	6.40
Donora, Pa.-2	118	130		123	140	140	5.70	6.15
Duluth-2	118	130		123	140	140	5.70	6.15
Fairfield, Ala.-11	118	130		123		136	5.70	6.15
Houston-63	126	138				149	6.10	6.55
Johnstown, Pa.-3	118	130			140		5.70	6.15
Joliet, Ill.2	118	130		123		140	5.70	6.15
Kokomo, Ind.-30	120	132		125	138	138	5.80	6.05
Los Angeles-62							6.65	
Kansas City-63	130	130	142	135		152	6.30	6.75
Minnequa-14	123	138	130	128	146	146	5.95	6.45
Monessen-16	124	135				145	5.95	6.40
Moline, Ill.-4			136					
Palmer-85								
Pittsburg, Cal.-24	137	149		147	156	160	6.65	6.80
Portsmouth-20	124	137			147	147	6.10	6.60
Rankin, Pa.-2	118	130			140	140	5.70	6.15
So. Chicago, Ill.-4	118	126	140	123		136	5.70	5.95
S. San Fran.-14				147		160	6.65	7.10
Sparrows Pt.-3	120			125	142	142	5.80	6.25
Sterling, Ill.-33	118	130	140	123	140	140	5.70	6.15
Struthers, Ohio-6							5.70	6.15
Torrance, Cal.-24	136						6.65	
Worcester-2	124						8.00	6.45
Williamsport, Pa.-51			150					

Cut Nails, carloads, base, $6.75 per 100 lb. (less 20¢ to jobbers). at Conshohocken, Pa., (26), Wareham, Mass. (53), Wheeling, W. Va., (15).

(1) Alabama City and So. Chicago do not include zinc extra.

CAST IRON WATER PIPE

Per Net Ton

6 to 24-in., del'd Chicago. $105.30 to $108.80
6 to 24-in., del'd N. Y.... 108.50 to 109.50
6 to 24-in., Birmingham. 91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less .....$108.50 to $113.00
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton: Effective CaF_2 content:
70% or more.....$43.00
60% or less..... 40.00

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½-3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																				
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0						
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.9	22.0	42.5	23.0	43.0	23.5	43.5	24.0						
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0						
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
St. Louis-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0						
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0						
Pittsburgh-88	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5		32.5		34.5	
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0						
Wheatland-89	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5						
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG, PLAIN ENDS																				
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0						
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0						
Oakland-19	24.5	4.0	26.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0						
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.5	15.5
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
St. Louis-32	34.5	14.0	38.5	18.0	40.5	21.5	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0						
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0						
Pittsburgh-88	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0		33.0		36.5	
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0						
Wheatland-89	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5						
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢.

Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb. *(Metropolitan area delivery, add 20¢ except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul, add 15¢; Memphis, add 10¢; Philadelphia, add 25¢; New York, add 30¢).

Cities	Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	5.60	6.84	7.49[2]–8.07	6.04	.....	5.80	6.14	6.04	6.84–6.89	10.24	10.54	11.89	12.19
Birmingham*	5.60	6.40	6.75	5.55	.....	5.95	5.70	5.55	.....	.....	.....	.....	.....
Boston	6.20	7.00–7.25	7.74–8.29	6.15	8.50[4]	6.48–6.78	6.20	6.05	6.79–6.84	10.25	10.55	11.90–12.00	12.20–12.30
Buffalo	5.60	6.40	7.74–8.09	5.86	.....	6.05	5.80	5.80	6.40–6.45	10.15–10.85	10.45	11.80	11.95–12.10
Chicago	5.60	6.40	7.75	5.55	.....	5.80	5.70	5.55	6.30	9.80	10.10	11.45	11.75
Cincinnati*	5.87	6.44	7.39	5.80	.....	6.19	6.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.69	6.90	5.92	5.82	5.57	6.40	9.91	10.21	11.56	11.86
Detroit	5.78	6.53	7.89	5.94	.....	5.99	6.09	5.84	6.56	10.11	10.41	11.76	12.06
Houston	7.00	8.25	.....	.....	.....	6.85	6.50	6.65	9.35	10.35	11.25	.....	12.75
Indianapolis, del'd	6.00	6.80	8.15	5.95	.....	6.20	6.10	5.95	6.80	.....	.....	.....	.....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.85	6.40	9.45[6]	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*	6.33–6.38	7.08–7.18	.....	6.33–6.38	.....	6.43–8.02	6.33–6.48	6.08–6.33	7.16–7.32	.....	.....	.....	.....
Milwaukee	5.74	6.54	7.89	5.69–6.89	.....	5.94	5.84	5.69	6.44–6.54	9.94	10.24	11.59	11.89
New Orleans*	5.70	6.59	.....	5.75	7.25	5.95	5.75	5.75	7.30	.....	.....	.....	.....
New York*	5.67–5.97	7.19[5]–7.24[1]	8.14[2]	6.29–6.89	8.63[4]	6.28–6.58	6.10	6.12	6.99	10.05–10.15	10.35–10.45	11.70–11.80	12.10–12.20
Norfolk	6.50[3]	.....	.....	.....	.....	6.50[3]	6.60[3]	6.55[3]	.....	.....	.....	.....	.....
Philadelphia*	5.90	6.80	8.00	6.10	.....	6.05	5.90	6.05	6.86	9.90	10.20	.....	.....
Pittsburgh	5.60	6.40	7.75	5.65–5.95	.....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60–7.55	8.95	8.50–9.10	7.30	.....	6.80	6.95	6.90	.....	.....	12.15	.....	.....
Salt Lake City	7.95	.....	9.70–10.50[2]	8.70–8.75	.....	8.05	6.75–8.30	7.95–8.65	9.00	.....	.....	.....	.....
San Francisco*	6.65	8.05[2]	8.55–8.90[2]	6.60	9.45[6]	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20–13.50
Seattle	7.05	8.60	9.20	9.05	.....	6.75	6.65	6.75	9.05	.....	.....	.....	.....
St. Louis	5.80–5.85	6.65	8.00	5.80	8.00[4]–8.28	6.13	6.03	5.80	6.55–6.65	10.05	10.35	11.70	12.00
St. Paul*	6.16	6.96	8.31	6.11	.....	6.36	6.26	6.11	6.96	10.36	10.66	12.01	12.31

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 6000 lb and over; (5) 1500 to 9999 lb; (6) 2000 to 5999 lb.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50	.....	.....	.....
Birmingham-4	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-91	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-92	48.38	48.88	.....	.....	.....	.....	.....
Buffalo-4	52.00	52.50	53.00	.....	.....	.....	.....
Buffalo-93	52.00	52.50	53.00	.....	.....	63.75	.....
Chicago-94	52.00	52.50	52.50	53.00	.....	.....	.....
Cleveland-2	52.00	52.50	52.50	53.00	57.00	.....	.....
Cleveland-4	52.00	52.50	52.50	.....	.....	.....	.....
Daingerfield, Tex.-95	48.00	48.50	48.50	.....	.....	.....	.....
Duluth-94	52.00	52.50	52.50	53.00	.....	.....	.....
Erie-94	52.00	52.50	52.50	53.00	.....	.....	.....
Everett, Mass.-96	.....	53.25	53.75	.....	.....	.....	.....
Fontana-19	58.00	58.50	.....	.....	.....	.....	.....
Geneva, Utah-16	52.00	52.50	52.50	53.00	.....	.....	.....
Granite City, Ill.-102	53.90	54.40	54.90	.....	.....	.....	.....
Hubbard, Ohio-6	52.00	52.50	52.50	.....	.....	.....	.....
Ironton, Utah-16	52.00	52.50	.....	.....	.....	.....	.....
Jackson, Ohio-97, 98	.....	.....	.....	.....	.....	62.50	.....
Lyle, Tenn.-101	.....	.....	.....	.....	.....	.....	66.00
Monessen-18	54.00	.....	.....	.....	.....	.....	.....
Neville Island-99	52.00	52.50	52.50	53.00	.....	.....	.....
Pittsburgh-1	52.00	.....	.....	53.00	.....	.....	.....
Sharpsville-100	52.00	52.50	52.50	53.00	.....	.....	.....
Steelton-3	54.00	54.50	55.00	55.50	60.00	.....	.....
Swedeland-26	56.00	56.50	57.00	57.50	.....	.....	.....
Toledo-94	52.00	52.50	52.50	53.00	.....	.....	.....
Troy, N. Y.-4	54.00	54.50	55.00	.....	60.00	.....	.....
Youngstown-6	52.00	52.50	52.50	53.00	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content over 0.70 pct. Silvery iron: Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

REFRACTORIES

Fire Clay Brick *(F.o.b. works) Carloads, Per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5) $94.60
No. 1 Ohio 88.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 88.00
No. 2 Ohio 79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala. $94.60
Childs, Pa. 99.00
Hays, Pa. 100.10
Chicago District 104.50
Western Utah and Calif. 111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago 111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 16.50
Silica cement, net ton, bulk, Hays, Pa. 18.70
Silica cement, net ton, bulk, Ensley, Ala. 17.60
Silica cement, net ton, bulk, Chicago District 17.60
Silica cement, net ton, bulk, Utah and Calif. 24.70

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Chester $82.00

Magnesite Brick

Standard, Baltimore $104.00
Chemically bonded, Baltimore 93.00

Grain Magnesite *St. ⅝-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed $62.70
Domestic, f.o.b. Chewelah, Wash., in bulk 36.30
in sacks 41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ $13.00

COKE

Furnace, beehive (f.o.b. oven) Net Ton
Connellsville, Pa. ..... $14.00 to $14.50
Foundry, beehive (f.o.b. oven)
Connellsville, Pa. ..... $17.00 to $17.50
Foundry, oven coke
Buffalo, del'd $26.69
Chicago, f.o.b. 23.00
Detroit, f.o.b. 24.00
New England, del'd 24.80
Seaboard, N. J., f.o.b. 22.00
Philadelphia, f.o.b. 22.70
Swedeland, Pa., f.o.b. 22.60
Painesville, Ohio, f.o.b. 24.00
Erie, Pa., f.o.b. 23.50
Cleveland, del'd 25.72
Cincinnati, del'd 25.06
St. Paul, f.o.b. 22.50
St. Louis 25.40
Birmingham, del'd 21.69
Neville Island 23.00

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports) *Per gross ton*

Old range, bessemer $8.70
Old range, nonbessemer 8.55
Mesabi, bessemer 8.45
Mesabi, nonbessemer 8.30
High phosphorus 8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

C-R SPRING STEEL

F.o.b. Mill Cents Per Lb.	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, Conn.-58	5.35	6.80	7.40	9.35	11.65
Carnegie, Pa.-41	.....	6.80	7.40	9.35	11.65
Cleveland-2	4.65	6.45	7.40	9.35	11.65
Detroit-68	5.60	6.65	7.25	.....	.....
New Castle, Pa.-40	5.35	6.80	7.40	9.35	.....
New Haven, Conn.-88	5.85	6.75	7.35	.....	.....
Sharon, Pa.-13	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va.-9	5.35	6.80	7.40	9.35	11.65
Worcester, Mass.-2	4.95	6.75	7.70	9.65	11.65
Youngstown-48	.....	6.80	7.40	9.35	11.65

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List Less Keg (Reg.)	K.	Less Keg (Hvy.)	K.
½ in. & smaller.	15	28½	15	28½
9/16 in. & ⅝ in..	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger.	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller.	26	37	22	34
9/16 in. & ⅝ in..	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger.	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller.	26	37	22	34
9/16 in. & ⅝ in..	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger.	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller.	35	45	28½	39½
9/16 in. & ⅝ in..	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger.	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thru ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts — *Pct Off List*

Packaged, steel, plain finished	56—10
Packaged, plated finish	41—10
Bulk, plain finish**	67*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets — *Base per 100 lb.*

½ in. & larger	$7.85
	Pct Off List
7/16 in. & smaller	36

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

(In bulk)	*Pct Off List*
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

ELECTRODES

Cents per lb., f.o.b. plant, threaded electrodes with nipples, unbored

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct, Coatesville, Pa. (21)	*29.5	
Washgtn, Pa. (39)	*29.5	
Claymont, Del. (29)	*28.00	
Conshohocken, Pa. (26)		*24.00
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon 10 pct Coatesville (21)	32.5	
Inconel-carbon 10 pct Coatesville (21)	40.5	
Monel-carbon 10 pct Coatesville (21)	33.5	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.235
18	4	1	—	5	$1.86
18	4	2	—	—	$1.38
1.5	4	1.5	8	—	78.5¢
6	4	2	6	—	.87¢

High-carbon chromium	63.5¢
Oil hardened manganese	35¢
Special carbon	32.5¢
Extra carbon	27¢
Regular carbon	23¢

Warehouse prices on and east of Mississippi are 3¢ per lb higher. West of Mississippi, 5¢ higher.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	36.0¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe.	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.48
Aluminum	29.00¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	10.75¢ plus metal value
Copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb.	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity	$3.50
Lead	7.5¢ to 12.0¢ plus metal value
Manganese	52.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	38.5¢
Solder powder	6.5¢ to 8.5¢ plus met. value
Stainless steel, 302	83.00¢
Stainless steel, 316	$1.10
Tin	14.00¢ plus metal value
Tungsten, 99%	$4.15
Zinc, 10 ton lots	23.0¢ to 30.5¢

ELECTRICAL SHEETS

22 Ga. H-R cut lengths

F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Bottom-15	....	7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge-28	....	7.25	8.50	9.30	9.85	....	....
Follansbee-63	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Granite City-22	....	7.95	9.20	....	....	....	....
Ind. Harbor-3	6.75	7.25	....	....	....	....	....
Mansfield-75	7.25	7.75	9.00	9.80	....	....	....
Niles, O.-64	7.05	7.55	....	....	....	....	....
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O.-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Transformer 52, 80¢ above Transformer 58.

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			32.00
62-66% Cr, 4-6% C, 6-9% Si.			32.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% Max. C.	$1.09
0.50% max. C.	1.05
.00 min. C.	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.00¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.20¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.00

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

FERROALLOYS

Ferromanganese
78-82% Mn. maximum contract base price, gross ton, lump size.
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont., Ashtabula, O..... $185
F.o.b. Johnstown, Pa..... $187
F.o.b. Sheridan, Pa..... $185
F.o.b. Etna, Clairton, Pa..... $183
$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.
Carload, bulk 10.95
Ton lots 12.55

Spiegeleisen
Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	74.00	75.00

Manganese Metal
Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.
Carload, packed 29.75
Ton lots 31.25

Electrolytic Manganese
F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
Carloads 28
Ton lots 30
Less ton lots..... 32

Medium Carbon Ferromanganese
Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn.....19.15¢

Calcium Metal
Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

Silicomanganese
Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.
Carload bulk 9.00
Ton lots 11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet..... 11.15
Ton lots 11.75

Silvery Iron (electric furnace)
Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $83.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal
Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.
96% Si, 2% Fe..... 21.70
97% Si, 1% Fe..... 22.10

Silicon Briquets
Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.
Carload, bulk 6.95
Ton lots 8.55

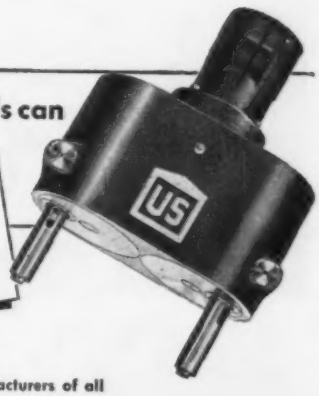
Electric Ferrosilicon
Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si.....	19.00	75% Si.....	14.30
50% Si.....	12.40	85% Si.....	15.55
90-95% Si			17.50

Low-Carbon Ferromanganese
Contract price, cents per pound Mn contained, lump size, del'd, Mn 85-90%.

	Carloads	Ton	Less
0.7% max. C, 0.06% P, 90% Mn.....	26.25	28.10	29.30
0.07% max. C.....	25.75	27.60	28.80
0.15% max. C.....	25.25	27.10	28.30
0.30% max. C.....	24.75	26.60	27.80
0.50% max. C.....	24.25	26.10	27.30
0.75% max. C, 7.00% max. Si.....	21.25	23.10	24.30

We'll stake our reputation on STANDARD *Adjustable* MULTIPLE SPINDLE DRILL HEADS



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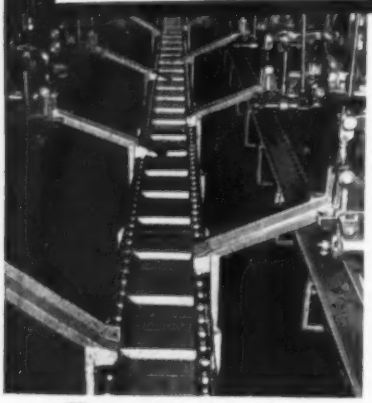

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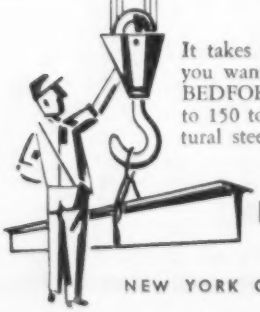

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Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	9.90¢
Ton lots	11.30¢
Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo.	$1.15
Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb.	
Ton lots	$4.90
Less ton lots	4.95
Ferro - Tantalum - columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta	$3.75
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo	$1.33
Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.35
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.50
Less ton lots	$1.55
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	$177.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$3.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.	
Openhearth	$3.00-$3.05
Crucible	3.10- 3.15
High speed steel (Primos)	3.25
Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	$1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa.	$1.13
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk lump	14.50¢
Ton lots, bulk lump	15.75¢
Less ton lots, lump	16.25¢
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.28
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	
carload, bulk	7.00¢

Boron Agents

Contract prices per lb of alloy, del.	
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$0.25
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.	
Ton lots, per pound	10.00¢
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots	$1.30
F.o.b. Wash., Pa.; 100 lb, up	
10 to 14% B	.75
14 to 19% B	1.30
19% min. B	1.50
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	$1.00
No. 6	65¢
No. 79	55¢
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.46
Less ton lots	1.57
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢

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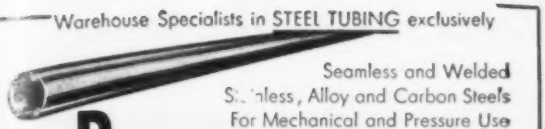

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10-H.P. line—wet cutting, rt. angle or bevel. Capacity: 2½" solids; 3" x ⅜" angles; 4½" tubing; ¾" x 3" flats. Write for literature. Specify shape, size and material to be cut.

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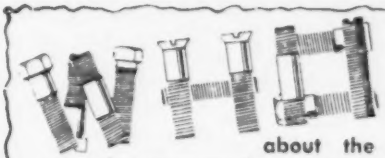

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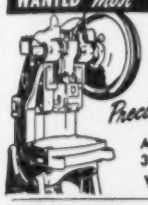

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10 ton Moore Lectromelt Furnace, With 4000 KVA Westinghouse Transformer 6600-250 volt, 3 phase, 60 cycle

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NEWS OF USED, REBUILT AND SURPLUS MACHINERY

On the Sidelines—The small manufacturer with 100 and less employees, faithful customer of the used and rebuilt machine tool field in normalcy, is standing on the sidelines watching the crowd of big-name manufacturers empty out his bargain basement. He shopped in used machinery before because he wanted economy.

Crowd of New Buyers—The fat backlogs of new machine tool builders have channeled off a huge surplus of big purchasers into the next field of availability—the used. Since the small manufacturer has not been receiving too many defense subcontracts he cannot start buying used equipment heavily. He must wait for big industry to become saturated with prime contracts before the subcontracts filter down to him. Consequently he does not know where to begin purchasing.

The Sad Leavings—The late stuff in used machinery has already been taken by the big need-converted customers, and if any more shows up in the near future they are ready to grab that, too. Reports keep circulating that the day of the bottom of the barrel is at hand. Before the smaller manufacturer can get rolling on defense, the best of this will be gone. He will be left with sad leavings.

Leaving Town—A considerable amount of used machines is being taken out of the Chicago market which is slow in getting started in defense work. The initial force of defense output came first in Detroit, the East Coast, West Coast, and Southwest.

Along civilian lines, though, Chicago business is booming. Demand for equipment has risen steadily and is standing at a peak right now. Inventories continue to lose strength with good late-type equipment a rarity and prices high. Replacement is becoming more difficult and buying is reaching to older stock.

Getting Its Share—Defense will get its share of new machine tools. NPA this week issued order M-40, establishing a system of pool orders under which General Services Administration will place firm orders for machine tools. Under M-41 defense and its contractors will get 70 pct of machines made under pool orders beginning July 1. Pool orders will carry DO ratings for materials.

Quick Change—A wartime practice is becoming a stronger trend. Some dealers are reported leasing machines to manufacturers for monthly fees and shares in profits of machine products. Others are thinking of reviving another World War II practice—setting up shop themselves and angling around for defense subcontracts.

Vanishing Act—In Cleveland, good, late-model general purpose machines have pulled a vanishing act out of the market. Buyers' offerings—at current high prices—sometimes go begging.

Dealers' stocks are mainly older machines which have not yet started moving in volume. Some special purpose machines of the late-model type are available but these are sometimes defective. Price is no object in the Cleveland market today as one dealer reported a $30,000 asking price for a Warner & Swasey 3-A turret lathe.

New York MDNA Meets—The New York Chapter of MDNA met recently at the warehouse and shop of Modern Tool Corp., Elizabeth, N. J. Jayco Machine Co., of New York City, applied for membership. The meeting featured a review of affairs at the recent Washington conference with government officials. Alfred Weisbecker, of Rosenkranz-Weisbecker Co., served as chairman.